

Eicon SNA Gateway Operator's Guide

For use with SNA LAN Gateway and SNA Connect

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Preface

Eicon SNA Gateway

EICON NETWORKS' SNA LAN GATEWAY AND SNA CONNECT ARE entry level gateways designed to run under the Microsoft® Windows® 2000 operating system. They provide remote branch offices with access to corporate SNA hosts.

SNA LAN Gateway and SNA Connect support TCP/IP and IPX/SPX LAN protocols. They also support multiple WAN protocols over leased, dialup and ISDN lines.

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Introduction

Before You Begin

THIS SECTION PROVIDES AN OVERVIEW OF THE DOCUMENTATION SET provided with Eicon SNA Gateway. This guide provides complete instructions on how to configure and start Eicon SNA Gateway and associated resources.

To help you access information more easily, read this section for a brief description of the reference material provided with your Eicon SNA Gateway package.

Eicon SNA Gateway Documentation

The complete Eicon SNA Gateway documentation set consists of the following items:

Documentation	Contains
Release Notes	Up-to-date features and changes to this product.
Installation Guide	Complete installation procedures.
Operator's Guide	Description of configuration options. Various gateway configuration scenarios. Description of the Eicon Management Tool. Command line syntax for operating your Eicon SNA Gateway.
Eicon Configuration Program Online Help	Screen-sensitive help for all configuration screens.

Syntax Conventions

The commands in this book use the following syntax:

Syntax Example	Description
RESET	Items in capital type are keywords. They can be entered in either uppercase or lowercase.
[/C <i>n</i>]	Items enclosed by a pair of square brackets are considered optional. You can either include them or not. Do not enter the brackets.
<i>n</i>	Items in lowercase italic type are user supplied input. Replace these items with the values you need, a number or a string of characters.
THIS THAT	Two items separated by a vertical bar means choose one item. Do not enter the vertical bar.
node1 ... node <i>n</i>	Items separated by an ellipsis indicate that you can enter a list of values.

For example, if a command is presented as:

```
RESET [ cfgfile ] [ node1 ... noden ] THIS | THAT
```

Then, you know that:

RESET	Enter as shown.
<i>cfgfile</i>	Use or omit this parameter, as you choose. If you use it, you must replace <i>cfgfile</i> with a value you supply.
<i>node1 ... node<i>n</i></i>	You may provide a list of values, for example SANJOSE, SANFRAN, OAKLND and so on.
THIS THAT	You must enter a value for either of the specified parameter.

Chapter Summary

The following is a summary of each of the chapters in this book.

Chapter One, “Introduction”: Introduces Eicon SNA Gateway.

Chapter Two, “Configuring Eicon SNA Gateway”: Describes how to use the Eicon Configuration Program to configure Eicon SNA Gateway.

Chapter Three, “SNA Resource Manager”: Describes how to configure the SNA Resource Manager module of the Eicon SNA Gateway.

Chapter Four, “Host Print”: Describes how to configure the Host Print module of Eicon SNA Gateway.

Chapter Five, “Remote Operation”: Describes how to operate the gateway from a remote client workstation.

Chapter Six, “Eiconcard Commands”: Describes the Eiconcard command line utilities, their syntax and use.

Chapter Seven, “ECMODULE Command”: Describes the use and syntax of the ECMODULE command.

Appendix A, “Configuration Checklists”: Provides additional information on configuration of Eicon SNA Gateway.

Appendix B, “Performance Optimization”: Provides performance statistics for all Eiconcards, and offers guidelines for optimizing performance.

Appendix C, “User Facilities and DTE Address Structure”: Describes X.25 network user facilities, and the DTE address structure.

Chapter One

Introduction

THIS CHAPTER IS AN INTRODUCTION TO, AND AN OVERVIEW OF, Eicon SNA Gateway and its functionality.

About Eicon SNA Gateway

Eicon SNA Gateway is designed to work under Microsoft® Windows® 2000 (Professional, Server, Advanced Server, or Datacenter Server). The gateway uses SNA protocols to connect client workstations in remote branch offices to corporate IBM® hosts.

Eicon SNA Gateway supports the use of 802.2 LLC, Frame Relay, SDLC, X.25 and Eicon IDLC WAN protocols over leased, dialup, and ISDN lines. It also works in conjunction with Eicon Networks' Eiconcard LAN Client, the full range of Eicon application development toolkits, and the Access® and Aviva® families of terminal emulations software to provide client workstations access to remote host applications.

Eicon SNA Gateway Architecture

There are two versions of the Eicon SNA Gateway: SNA LAN Gateway and SNA Connect. For the purposes of this guide, "Eicon SNA Gateway" is used to refer to either of these products, and the phrase "gateway PC" is used to refer to the computer on which the Eicon SNA Gateway software is installed.

SNA LAN Gateway

SNA LAN Gateway provides client workstations on a LAN with access to remote hosts. This product has a LAN-based architecture that follows a client/server paradigm. The SNA LAN Gateway software is installed on a LAN PC, which becomes the gateway PC (server) that provides access to connected host computers. The gateway PC, in turn, is accessed by client workstations on the LAN that are equipped with terminal emulation or other connectivity software such as the Eiconcard LAN Client software. Client workstations on the LAN can use the TCP/IP and IPX/SPX LAN protocols to connect to the SNA LAN Gateway.

SNA Connect

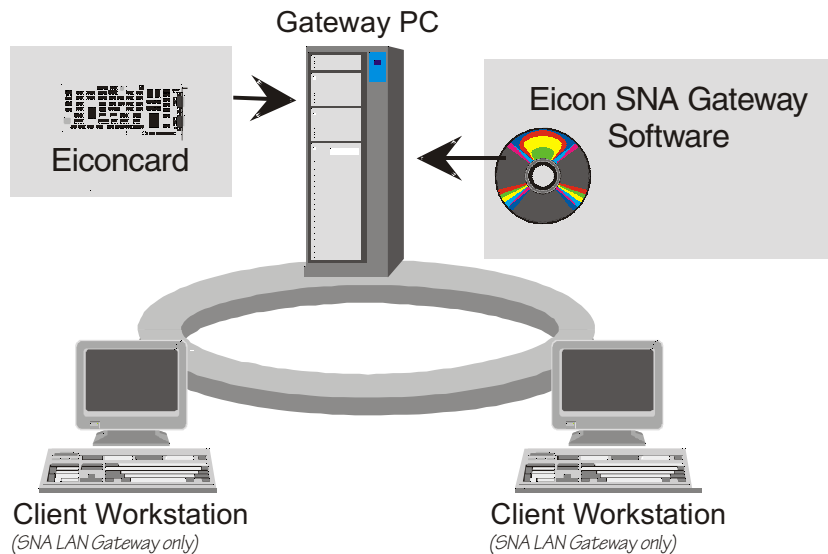
SNA Connect is a PC-based remote access package. SNA Connect does not have the same LAN-based architecture of the SNA LAN Gateway. Instead it is designed to enable standalone workstations in branch offices to connect to remote hosts.

¹ The Eicon Access and Aviva terminal emulation software products are available from Aviva Solutions Inc. For more information, go to www.avivasolutions.com.

Eicon SNA Gateway Components

Eicon SNA Gateway is a combination of sophisticated communications hardware and software. The Eicon SNA Gateway software consists of SNA protocol software and, for the SNA LAN Gateway, LAN Transport services.

The diagram below presents an overview of Eicon SNA Gateway components and installation locations:



Eicon SNA Gateway components

The gateway PC maintains the link to remote host computers and handles all processing of 802.2 LLC, SDLC, X.25/QLLC, Frame Relay, or Eicon IDLC communications protocols. Most of the work is actually done by the Eiconcard, allowing the gateway PC to be used for other tasks as well.

SNA LAN Gateway includes LAN Transport software that enables the gateway PC to provide communications services to workstations on the LAN. Workstation users run terminal emulation software, such as Aviva[®] for Desktops, to establish connections with any host to which the gateway PC is linked.

Eiconcard Support

The Eiconcard is the hardware device used to operate the Eicon SNA Gateway. It is an intelligent communications coprocessor, with its own CPU and on-board memory. It is sold separately.

Depending on which Eiconcard you have, the external interface support includes V.24 (RS-232 and X.21*bis*), V.35, X.21 with V.11 (X.27), and ISDN Basic Rate Interface (BRI).

The type of Eiconcard (adapter) you choose depends on the volume of information you need to transmit and the number of connection types you will use. Eicon SNA Gateway supports the use of multiple Eiconcards under Windows 2000.

The following is a list of Eiconcards that are supported by Eicon SNA Gateway:

Card	Type	Serial Interface
Eiconcard C20	C-Series	1 V.24
Eiconcard C21	C-Series	1 V.24, 1 ISDN BRI
Eiconcard C90	C-Series	1 V.24
Eiconcard C91	C-Series	1 V.24, 1 ISDN BRI
Eiconcard S50	S-Series	1 HSI
Eiconcard S51	S-Series	1 HSI, 1 ISDN BRI
Eiconcard S52	S-Series	2 HSI
Eiconcard S90	S-Series	1 VHSI
Eiconcard S91	S-Series	1 VHSI, 1 ISDN BRI
Eiconcard S92	S-Series	2 VHSI
Eiconcard S94	S-Series	2 VHSI

SNA Protocol Support

This section describes briefly the different protocols that you can use with Eicon SNA Gateway to link to a remote host.

Integrating with IBM's SNA

IBM's SNA (System Network Architecture) is a seven-layered architecture that controls the exchange of information between IBM systems. Eicon SNA Gateway provides full support for SNA protocols including: SNA Path Control, SNA Function Management, APPC/LU6.2, and NetView over data-link protocols such as 802.2 LLC, SDLC, X.25/QLLC, Frame Relay, and Eicon IDLC. These protocols are fully configurable to meet the needs of specific implementations.

Nodes and Logical Units

In IBM's SNA architecture, the access point for the SNA network is the logical unit (LU). One or more LUs are managed by a Node, which is typically a dedicated piece of equipment called the cluster controller. The gateway protocol software emulates multiple cluster controllers on the Eiconcard, requiring minimal overhead on the gateway PC. Eiconcards can emulate up to 32 nodes, with up to 254 fully configurable LU definitions.

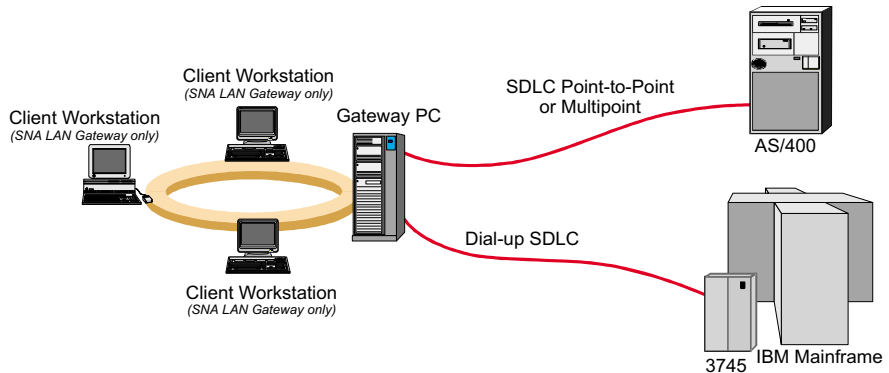
SNA Connectivity

Eicon SNA Gateway provides access to a variety of IBM hosts over 802.2 LLC, SDLC, Eicon IDLC, X.25/QLLC, and Frame Relay links. These protocols are also supported over ISDN. With Eicon SNA Gateway you can connect to S/370, S/390, and ES9000 mainframes, as well as AS/400, System/36, and System/38 midrange systems.

Client workstations can use desktop terminal emulation products, such as Aviva for Desktops, and a full range of Eicon Networks' application development toolkits for advanced program-to-program connectivity (APPC) or for access to SNA host applications (SNAFM).

SDLC

SDLC (Synchronous Data Link Control) is the primary data link protocol used for wide-area network connections within SNA. It is used to manage information exchanged across a single physical data link between two nodes.

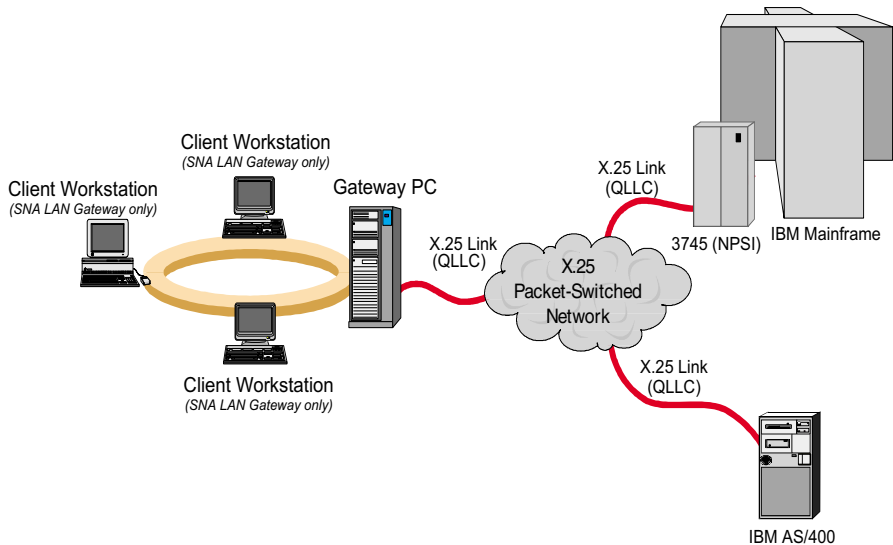


Making SDLC connections with Eicon SNA Gateway

SDLC is part of the original design of SNA, and is the foundation upon which all other connections are based. The Eiconcard supports point-to-point, multipoint, and switched dial-up SDLC links.

X.25/QLLC

X.25 is a widely supported internetworking protocol used by private and public telecommunications networks. X.25 is designed to carry high volumes of data quickly and without errors, and uses packet-switching to transmit data between connected computers.



Making an X.25 connection using Eicon SNA Gateway

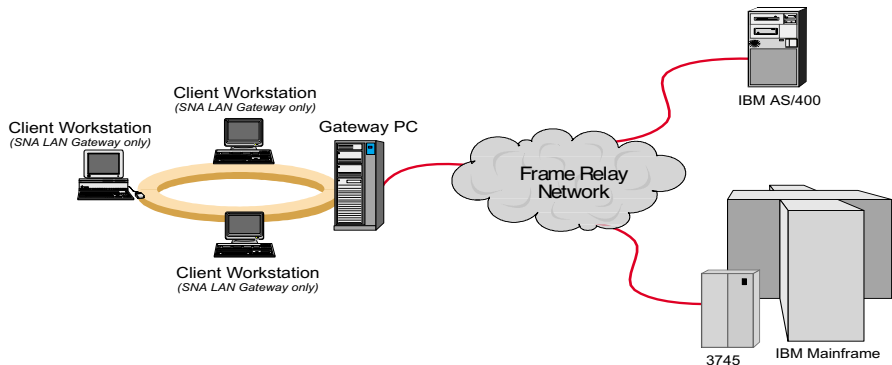
Eicon Networks' products comply with X.25 network standards in over 45 countries and adhere to GOSIP (Government Open Systems Interconnection Profile) requirements.

For SNA (System Network Architecture) communications over an X.25 connection, Eicon SNA Gateway uses the QLLC (Qualified Logical Link Control) protocol. QLLC is SNA data packaged for transmission over an X.25 network.

An X.25/QLLC line can support multiple logical connections over a single physical link. Once Eicon SNA Gateway is connected to the X.25 network, it can then link to any X.25-attached IBM host. You must, however, make sure that Network Packet Switching Interface (NPSI) is running on the front-end processor (FEP) of the host. NPSI is an IBM program that allows IBM host applications running VTAM to communicate over X.25-compliant networks. This IBM program runs in an IBM communications controller with the Network Control Program (NCP). NPSI is required to implement QLLC and allow 3725 or 3745 FEPs to be accessible via an X.25 network.

Frame Relay

Eicon SNA Gateway supports the transport of SNA traffic over Frame Relay (SNA/FR) connections. This allows Eicon Networks to support IBM products that comply with RFC 1490, such as Advanced Communications Function/ Network Control Program (ACF/NCP) Version 7 Release 1 and OS/400 Version 2 Release 3 for the AS/400.



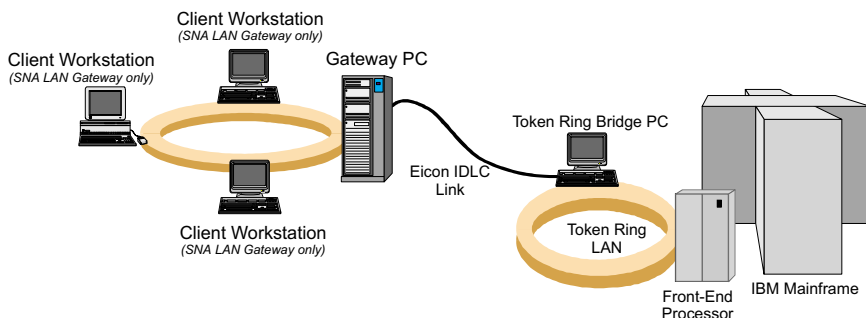
Making SNA connections over a Frame Relay network with Eicon SNA Gateway

Node Types 2.0 or 2.1 locally emulated on Eicon SNA Gateway can connect to remote AS/400s or 3745s via Frame Relay networks. The following features are supported with Eicon Networks' implementation of SNA over Frame Relay:

- Traffic originating from multiple nodes may be sent over the same virtual circuit provided that each node uses a different SSAP-DSAP pair.
- SNA/FR may be installed on multiple Eiconcards in the same gateway. All Eiconcard ports configured for Frame Relay can be used by SNA/FR.
- SNA/FR conforms to RFC 1490.
- SNA/FR can be used to transport any type of Logical Units (LUs) supported by the 2.0 and 2.1 type nodes in Eicon SNA Gateway.

Eicon IDLC

The Eicon ISDN Data Link Control (Eicon IDLC) protocol is a proprietary Eicon protocol which enables the transport of SNA traffic via ISDN connections. This protocol is used in communications with the Eicon Token Ring Bridge.



Connecting to a Token Ring Bridge with Eicon SNA Gateway

The Token Ring Bridge resides on the same Token Ring LAN as the SNA host's communications controller or Front-end processor (FEP). The FEP manages the flow of data between the LAN and the host. The Token Ring Bridge manages the flow of data between the LAN and the ISDN network.

The Eicon IDLC protocol enables the gateway to access to the remote host through the Eicon Token Ring Bridge. This protocol can be used to transport any type of Logical Units (LUs) supported by the 2.0 and 2.1 type nodes in Eicon SNA Gateway.

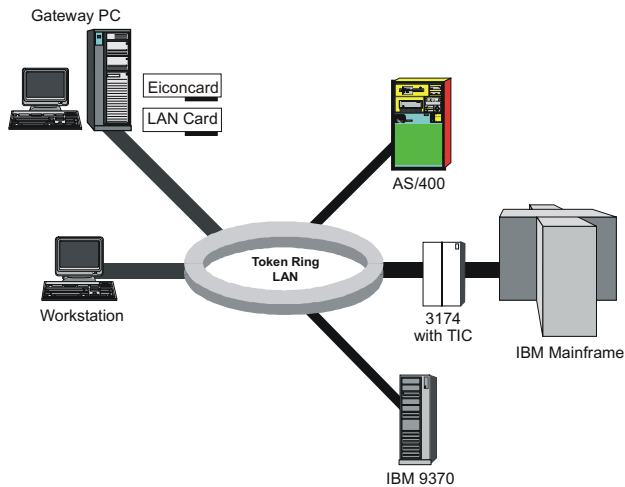
In the Eicon Configuration program, Eicon IDLC is abbreviated as EC-IDLC.

802.2 LLC (SNA LAN Gateway only)

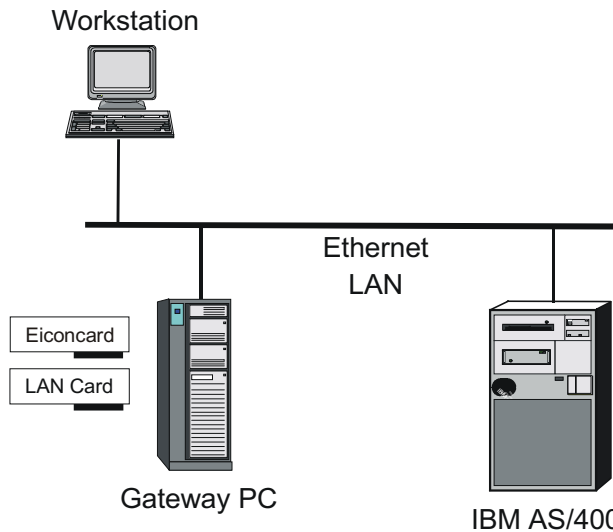
With an 802.2 LLC connection (also commonly referred to as IEEE 802.2 Logical Link Control), SNA LAN Gateway allows a client to connect to IBM devices that are directly attached to Token-Ring (802.5) or Ethernet (802.3) LANs.

SNA LAN Gateway uses the port on your Token-Ring or Ethernet LAN card to make an 802.2 LLC connection instead of going through a port on the

installed Eiconcard. SNA protocol processing still takes place on the Eiconcard.



Making a Token-Ring connection with SNA LAN Gateway



Making an Ethernet connection with SNA LAN Gateway

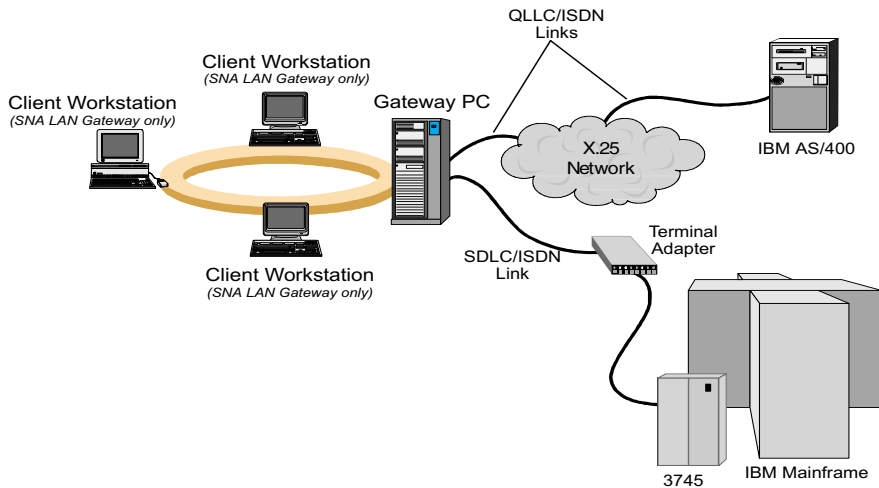
The Eiconcard can be used to support other types of connections at the same time.

Data travels from a workstation PC along the backbone to the SNA Gateway. It is packaged into SNA frames and returned to the LAN so it can be collected by an IBM controller or host.

Information returning from the host travels along the LAN to the Eiconcard in the SNA Gateway where it is unpackaged and then sent to its destination PC across the LAN.

ISDN Support

ISDN (Integrated Services Digital Network) provides end-to-end digital connectivity to support a wide range of services.



Connecting to IBM hosts over ISDN lines with Eicon SNA Gateway

Since ISDN standards vary from country to country, Eiconcard software has been developed to suit the different implementations. Currently, Eicon Networks supports the following ISDN implementations: NI-1 (North America), INS-Net64 (Japan), TPH 1962 (Australia), EuroISDN (Europe), and 5ESS (AT&T proprietary).

ISDN support is provided through the C21, C91, S51, and S91 Eiconcards as well as Eicon SNA Gateway software. The X.25/QLLC, SDLC, Eicon IDLC and SNA over Frame Relay protocols are supported over ISDN.

The C21, C91, S51, and S91 Eiconcards support ISDN Basic Rate Interface (BRI) connections. BRI is defined as two 64kbps B Channels and one 16 kbps D Channel. The B Channels are protocol independent and can carry X.25,

SDLC, and SNA over Frame Relay traffic. The D Channel is a signaling channel that controls B Channel usage. Some national implementations such as NI-1 can carry X.25 data as well as signaling on the D Channel.

Chapter Two

Configuring Eicon SNA Gateway

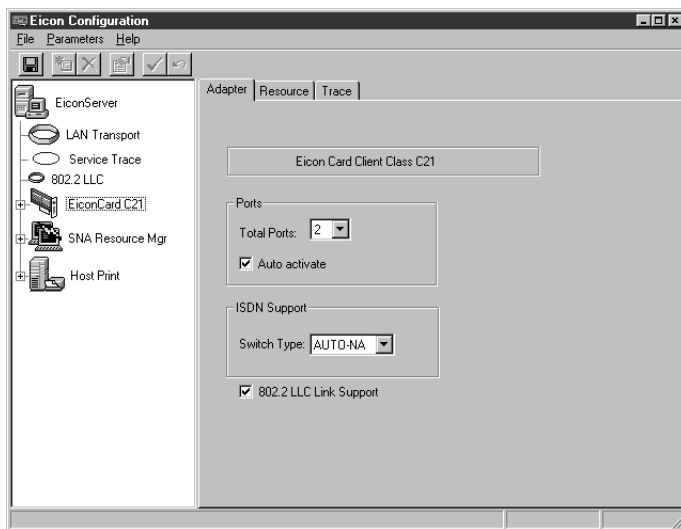
THIS CHAPTER DESCRIBES HOW TO CONFIGURE THE EICON SNA GATEWAY using the Eicon Configuration Program.

Overview

Eicon SNA Gateway configuration is a two-part process.

- 1 Configure the Eiconcard(s) and LAN Transport.
- 2 Configure the applications that will use the Eiconcards and Eicon SNA Gateway software (for example, Host Print).

The Eicon Configuration Program provides a graphical view of all configurable resources.

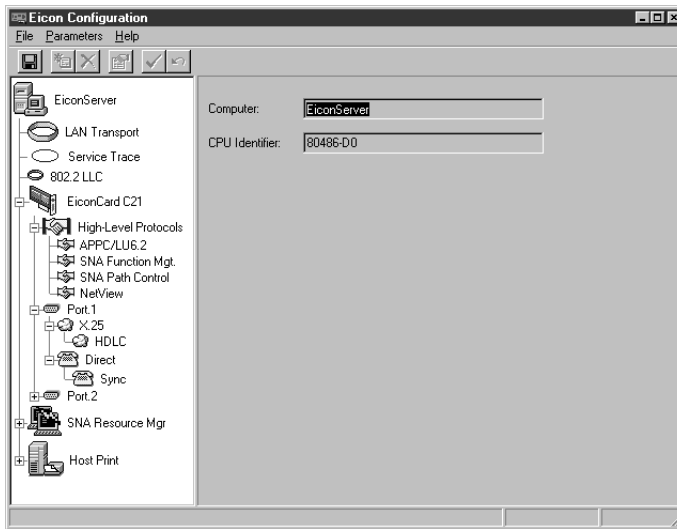


Click the Eiconcard icon to display the Eiconcard configuration panel. Double-click the same icon to reveal additional icons used to activate port and protocol configuration options.

The configuration program enables you to set all configuration parameters and the relationships between them. Default values, which are provided for most parameters, facilitate the selection process and may generally be left unchanged.

Configuration Components

The Eicon Configuration Program consists of several modules. These modules include the following components: EiconServer, LAN Transport, Service Trace, 802.2 LLC (SNA LAN Gateway), Eiconcard, SNA Resource Manager, and Host Print (SNA LAN Gateway).



Note Use the Online Help for the Eicon Configuration Program to guide you through the configuration of the gateway.

EiconServer (computer name)

The server icon represents the gateway PC. The computer name, EiconServer in this case, can be changed only through the Windows 2000 System Properties.

LAN Transport (SNA LAN Gateway only)

The LAN Transport module handles Eiconcard LAN Server configuration. Although Eiconcard LAN Server is configured in the Eicon Configuration Program, it is an independent component and does not require any optional services support. Configuring this component allows for client-server connectivity. For more information see “LAN Transport (Eiconcard LAN Server)” on page 38.

Service Trace

The Service Trace component is a diagnostic tool. It enables you to configure traces for the LAN Transport and for 802.2 LLC connections.

802.2 LLC (SNA LAN Gateway only)

Although this component is visible in the navigator window, there are no configurable options. Its sole purpose is to indicate whether or not support for 802.2 LLC connections has been enabled.

Eiconcard

The Eiconcard handles all link-level and high-level protocol processing for each type of connection. You must configure a separate Eiconcard port for each individual physical connection (SDLC, X.25, Frame Relay, or Eicon IDLC) you want to make.

However, in the case of 802.2 LLC connections, communication takes place through the LAN card and it is not necessary to configure an Eiconcard port.

SNA Resource Manager

The SNA resource manager controls the definition and allocation of all SNA resources, which include nodes and LUs.

Configuration of the SNA Resource Manager component is discussed in Chapter Three, “SNA Resource Manager.”

Host Print (SNA LAN Gateway only)

Host Print provides print queue services to client workstations on the SNA LAN Gateway. It allows client print jobs to be directed to any shared print queue on the network.



Configuration of the Host Print component is discussed in Chapter Four, “Host Print.”

The Eicon Configuration Program


The Eicon Configuration Program is designed to assist you in the configuration of Eicon SNA Gateway resources. Its graphical user interface provides a view of the logical structure of the gateway configuration components, displaying all installed hardware and software.

The Navigator is composed of a series of icons that show the current logical configuration path. When you click an icon, the parameters associated with the corresponding component appear in the parameter area.

Adding and Deleting Configuration Components

Once you have finished setting the parameter values for a particular configuration component on the Navigator, you may click the  button or another item in the Navigator to accept them, or click the  button to cancel your entries.

Each time a change or addition is made, the Navigator reflects the modifications to the logical configuration path. With this mechanism, you can select any component directly, and then modify the desired parameters in the parameter area. In addition, the Eicon Configuration Program scans the Navigator to detect which components, if any, are affected by a change. See the “Scanning Dependent Configuration Items” topic provided by the online help for the Eicon Configuration Program.

Once you leave a configuration panel and select another item in the Navigator, all newly configured parameters are automatically stored in memory. To permanently save them, click the  button or choose the File Save option.

Altering Protocol Parameters

When a parameter is changed, all parameters affected by the change in the current configuration panel are updated. In addition, if these changes affect parameters in other Eicon SNA Gateway components, a warning message appears that displays the names of the affected parameters.

If any of the settings on the current panel are not valid, the Eicon Configuration Program will not allow you to proceed to the next parameter or configuration panel. Also, all required parameters must be configured for proper functionality.

Each protocol has a number of parameters associated with it. These parameters let you customize the protocol software for your particular connection. However, in most cases you will not have to change the default values of these parameters.

Eicon SNA Gateway protocols can be configured to suit almost any communications situation. However, since there are so many types of equipment, switches, and networks with which the gateway can interact, there can be uncertainty about which parameters need to be changed. To simplify the configuration process, the best possible default values have already been determined for each protocol parameter, and in most cases the parameters do not need to be changed.

In some cases, you will have to change the default values of certain parameters. Refer to the section “Configuration Notes” on page 40 of this chapter for more information.

Eicon Configuration Program Menus

The following table describes all the available menu options.

File Menu

Option	Description
Save...	Saves the gateway configuration settings to the Windows registry.
Import...	Allows you to load an existing gateway configuration file into the Eicon Configuration Program.
Export...	Allows you to save the configuration settings, including Eiconcard number and type, to an ASCII file. The default file extension is .EIC.
Select Computer	Allows you to identify the remote server name for remote configuration.
Exit	Closes all Eicon SNA Gateway windows and exits the Eicon Configuration Program.

Note *Do not import a configuration file if the type of card in the gateway PC has been changed, or if the number of cards in the gateway PC has been changed.*

Use File Import to apply different connections, Host Print, or SNA Resource Manager configurations to the same card(s).

Parameters Menu







Option	Description
<u>U</u> ndo	Cancels all changes made to the current configuration panel.
<u>C</u> onfirm entries	Saves all changes made to the configuration panel currently displayed.
<u>P</u> roperties	Invokes the configuration panel for certain configurable parameters.

Help Menu

Option	Description
<u>C</u> ontents	Contains general help topics for the Eicon Configuration Program.
<u>A</u> bout	Copyright and version information for the Eicon Configuration Program.

Toolbar Buttons

Click an Eicon Configuration Program toolbar button to perform the desired action:

Button	Name	Description
	Save configuration button	Saves your current configuration.
	Add new item button	Inserts a new element into your configuration.
	Delete item button	Deletes the selected item.
	Properties button	Displays configuration panels for this item and allows you to edit the entry as desired.
	Confirm entries button	Accepts the configured settings.
	Undo button	Undoes the last action.

Online Help

Included with the Eicon Configuration Program is extensive and context-sensitive online help for each configuration parameter. Just click on the parameter in which you are interested and press “F1.”

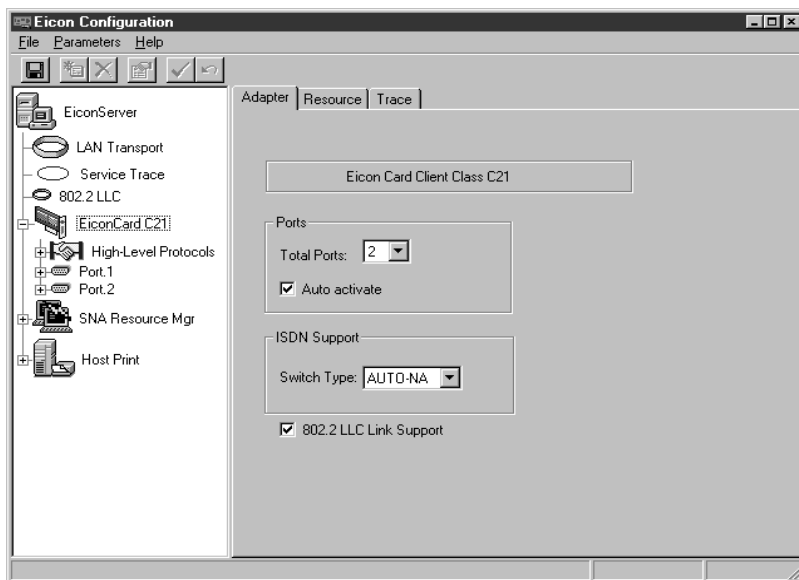
Note *You may want to have the Online Help window open while you configure your Eicon SNA Gateway components. To do this, open the Help Window, click the Options button, and choose Keep Help on Top. You can then position the online help window beside the configuration panel for easy reference during configuration.*

The Online Help for the Eicon Configuration Program provides information to help you configure Eicon SNA Gateway. The following topics are covered online:

- About the Eicon Configuration Program
- The Navigator: An Overview — displays a graphical representation of each Eicon SNA Gateway component and subcomponent as well as a brief description
- Using the Navigator — describes how to move around the Navigator and access information quickly and easily
- Creating a New Configuration File — describes how to change your configuration then save it in a file for future use
- Commands and Buttons — complete descriptions of all toolbar buttons and menu options
- Getting Help — describes how to use the online help for the Eicon Configuration Program
- Glossary of networking terms (click the *Glossary* button)
- Alphabetical index of all program parameters showing the valid ranges and default values

Eiconcard Configuration

The Eiconcard component displays the currently configured parameters for the specified Eiconcard.



Each Eiconcard component contains a number of different configuration panels that allow you to adjust parameters in the following areas:

- Eiconcard
- High-Level Protocols
- Ports

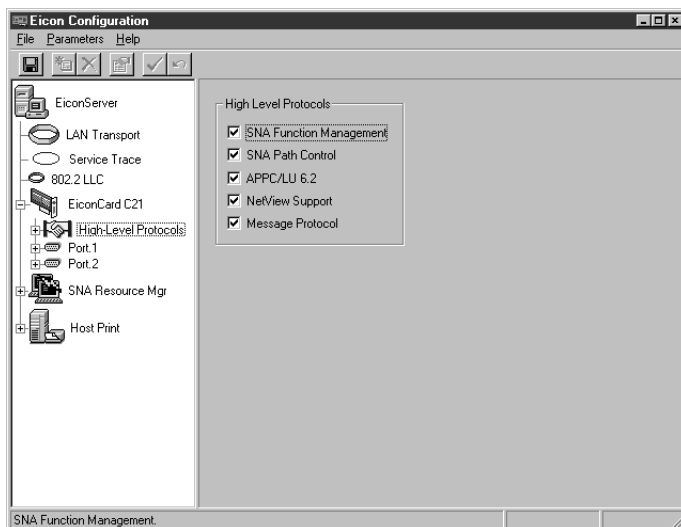
High-Level Protocol Configuration

Eicon SNA Gateway supports the following high-level protocols:

- APPC/LU 6.2
- SNA Function Management
- SNA Path Control
- NetView Support
- Message Protocol

The protocols APPC/LU 6.2, SNA Function Management, and SNA Path Control provide support for SNA communications at different levels. SNA Path Control provides the lowest level of support and APPC/LU 6.2 provides the highest. For the higher level protocols to operate, the lower level protocols must be activated.

Select the High-Level Protocols icon to display the configuration panel.



APPC/LU 6.2

Advanced Program-to-Program Communication (APPC) is used by a wide variety of transaction programs for program-to-program communications. Eicon SNA Gateway provides complete support for LU 6.2. If your application requires peer-to-peer connections, or if you are using the Eicon Networks APPC Toolkit, you should activate this protocol. If you select this option, the configuration program automatically selects the other protocols required to operate APPC/LU 6.2; SNA Function Management and SNA Path Control.

SNA Function Management

SNA Function Management starts automatically when APPC is activated. Many third-party terminal emulators interface with Eicon SNA Gateway at this level. SNA Function Management also needs to be active if you define nodes with support for LU 0, or if you use Eicon Networks SNA Function Management Toolkit applications.

SNA Path Control

SNA Path Control starts automatically when SNA Function Management is activated. SNA Path Control must be active if you intend to support SNA nodes. All Aviva 5250 and 3270 terminal emulations interface with Eicon SNA Gateway at this level.

NetView Support

Activating NetView support lets your Eicon SNA Gateway become a part of an IBM NetView or System Center Net/Master network management system. Information about the gateway and its status is reported to the host through Entry Point functions. Commands from a NetView host terminal are executed on the gateway via the Service Point functions using RUNCMD.

Integration with IBM's NetView and System Center Net/Master provides the capability to control and view the gateway from a remote console. Activate Eicon Networks' NetView Support to provide the following features:

- NetView Entry Point implementation forwards SNA alerts, data-link statistics and Response Time Monitor (RTM) data to NetView.
- NetView Console provides local display of Response Time Monitor (RTM) and statistical data, and operator generated alerts.
- NetView Service Point RUNCMD Agent supports remote execution of Eicon SNA Gateway commands from NetView's Network Control Command Facility.

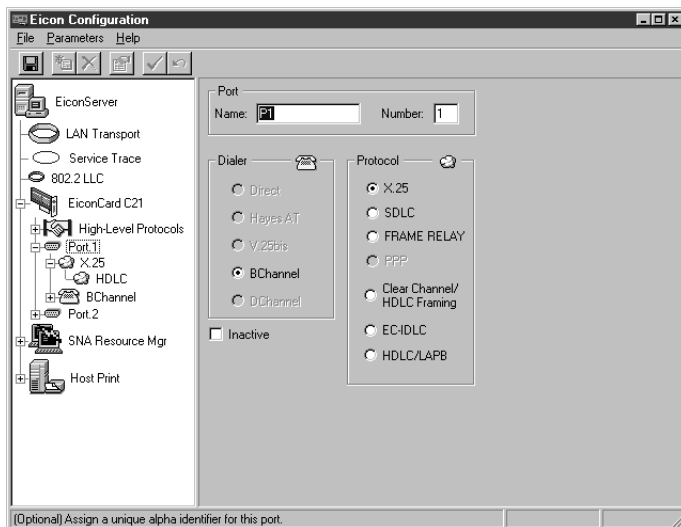
Message Protocol

This protocol is proprietary to Eicon Networks. Select this protocol if you need to do either of the following:

- Use Aviva's Desktop X.25 connections type to connect to the remote host over X.25 connections.
- Make an 802.2 LLC connection to the remote host.

Port Configuration

Use the Port configuration panel to assign the line protocols and dialer options for each port.



Line Protocol Configuration

Line protocols handle the data transfer. The configuration program supports the line protocols listed below through the physical ports of the Eiconcard.

- Eicon IDLC
- Frame Relay
- SDLC
- X.25

For further information on these protocols see “SNA Protocol Support” on page 17.

Note *The 802.2 LLC protocol does not require the use of an Eiconcard port.*

Dialer Configuration

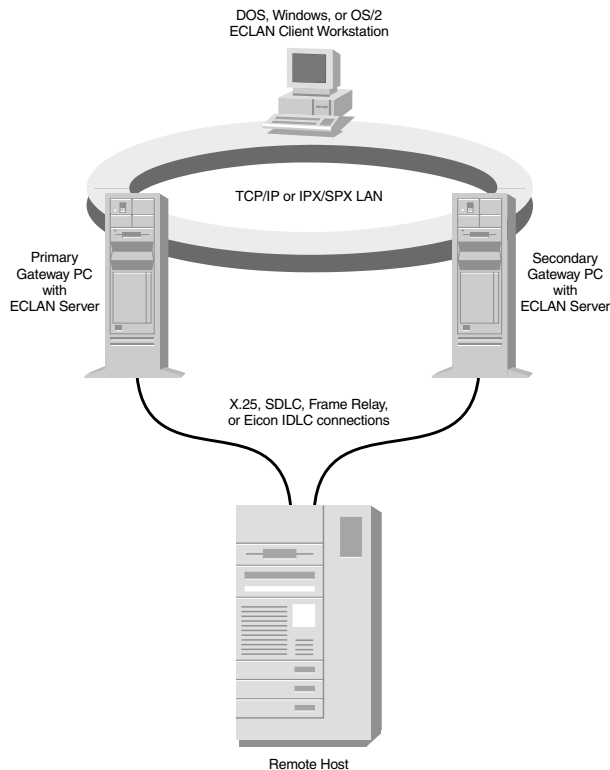
Eicon SNA Gateway supports a number of options for dialing both internal and external modems. Select one of these options based on the Eiconcard and line type you are using:

- Direct (hardware dialer)
- Hayes AT (asynchronous dialer)
- V.25*bis*
- BChannel (ISDN)
- SIG.+X.25 (ISDN)

LAN Transport (Eiconcard LAN Server)

There are two components to the Eiconcard LAN software: a server component (installed on the gateway PC) and a client component (installed on each client workstation). Together these two components handle connections between the gateway PC and all client workstations on the LAN or other connected LANs. Eiconcard LAN is currently supported over TCP/IP and IPX/SPX.

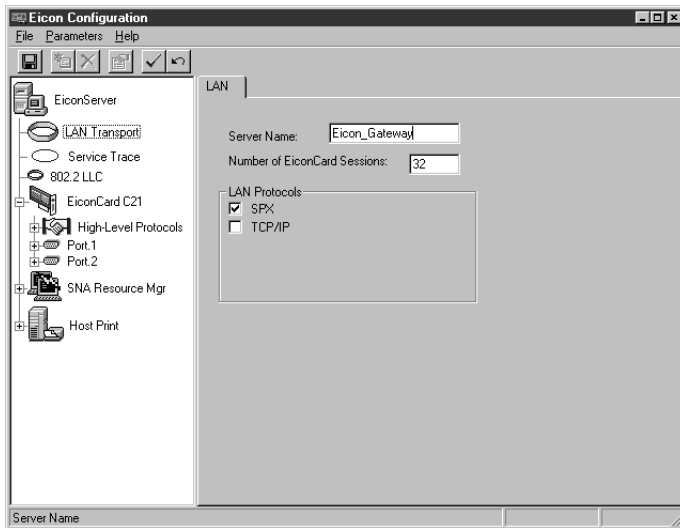
For DOS, Windows and OS/2 clients, the Eiconcard LAN software allows clients to use the services of a backup gateway PC if the primary gateway PC becomes unavailable. It also provides the ability to activate, deactivate, and monitor sessions on the gateway PC from the client workstation.



Client connections to remote hosts via SNA LAN Gateway

LAN Transport on the Gateway

There is no limit to the number of SNA LAN Gateways that can be installed on a LAN. To configure LAN Transport on the gateway, you must specify the number of sessions the gateway has to support. In addition you must also specify the LAN protocols that you are using. SNA LAN Gateway supports TCP/IP and Novell's IPX/SPX.



Note *If you install multiple SNA LAN Gateways on your LAN, each must have a unique Server Name.*

Configuration Notes

The following are important considerations when you configure certain Eicon SNA Gateway parameters.

Configuration Values

When you subscribe to an X.25 or Frame Relay network, your network services provider should supply you with documentation on the characteristics of that network. If documentation has not been provided, contact the agency that installed the connection and request this information.

Review each parameter of the X.25 or Frame Relay network, and make sure that your Eicon SNA Gateway configuration parameter values match the corresponding X.25 or Frame Relay network parameter values. For example, if the X.25 network has a default packet size of 256, and the Eicon SNA Gateway configuration parameter is set to a default packet size of 128, then you may encounter problems transmitting data over the X.25 network.

X.25 PVCs

If you configure only X.25 permanent virtual circuits (PVCs) in the X.25 configuration panel, make sure to configure a port for “X.25 PVC.” By default, “X.25 SVC” is set, and will prevent any sessions from being established if you do not change this value.

Dialer Sync Configuration

- If you configure your Eiconcard with the *Clocking* parameter set to “INT+DPLL” and the *Data Encoding* parameter set to “NRZI,” the maximum value of the *Line Speed* parameter is 19200 bps.
- If you configure your Eiconcard with the *Clocking* parameter set to “INT+DPLL” and the *Data Encoding* parameter set to “FM0” or “FM1”, the maximum value of the *Line Speed* parameter is 38400 bps.
- If you configure your Eiconcard with the *Clocking* parameter set to “INT,” you must make sure that the cable(s) are properly attached and terminated on the other end. Failure to do so may result in an *Out of State* condition for the Eiconcard. It may also cause the Eiconcard commands (ECCARD, ECMODULE, and ECDIALER) to function improperly.

SDLC Window Size and Frame Size

To connect to a host using SDLC, you must make sure that parameters such as your window and frame size match those of the host. For example, the Eicon SNA Gateway configuration frame size is set to a default of 267 octets. If the host's frame size is different from this value, you will encounter problems transmitting data. If you do not know the host's parameter values, contact the host's system operator.

Frame Relay DLCI

When you subscribed to a Frame Relay network, you should have received documentation from your network services provider about network characteristics such as your DLCI(s) and the N1 through N3 parameters. You should ensure the best possible match between the Eicon SNA Gateway Configuration values for Frame Relay and those used by your Frame Relay network.

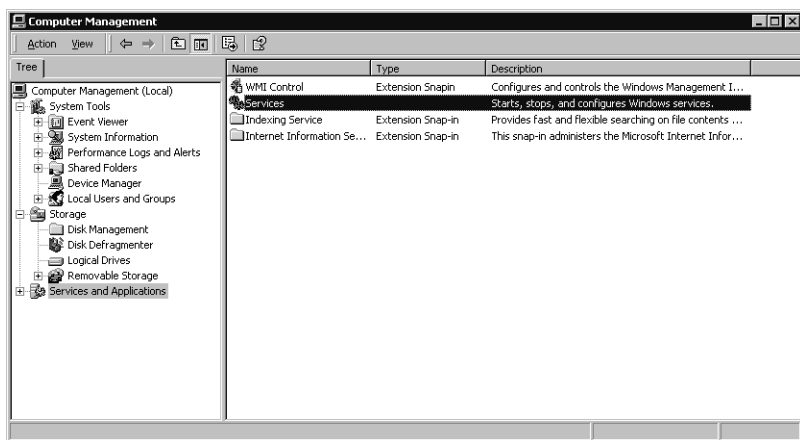
Note *Do not use Dynamic DLCI with SNA over Frame Relay connections.*

Stopping and Restarting the Eiconcard and Related Services

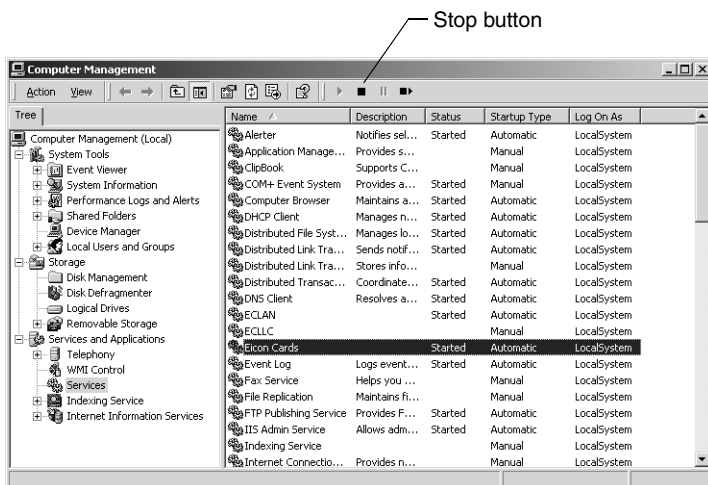
Each time you reconfigure any Eiconcard component, you must stop and then restart the Eiconcard(s) installed in the gateway PC, and any related services, for the changes to take effect. Use Windows 2000 Computer Management to stop and restart the Eiconcard(s) and related services.

► **To stop and restart the Eiconcard(s):**

- 1 On the Desktop, right-click *My Computer*, and then click *Manage*. The Computer Management dialog box opens.
- 2 In the left pane, click *Services and Applications* and then, in the right pane, double-click *Services*.



- 3 Highlight the *Eicon Cards* entry in the Services list and click the stop button.



- 4 If they are started, stop the ECLAN and ECLLC services also. Highlight the service and then click the stop button.
- 5 To restart the Eiconcard(s) and related services, select their entries in the Services list and click the start button ▶.

Chapter Three

SNA Resource Manager

THIS CHAPTER DESCRIBES THE SNA RESOURCE MANAGER COMPONENT of the Eicon SNA Gateway, and how to configure it. The SNA Resource Manager controls the definition and allocation of all SNA resources.

Configuring SNA Resource Manager

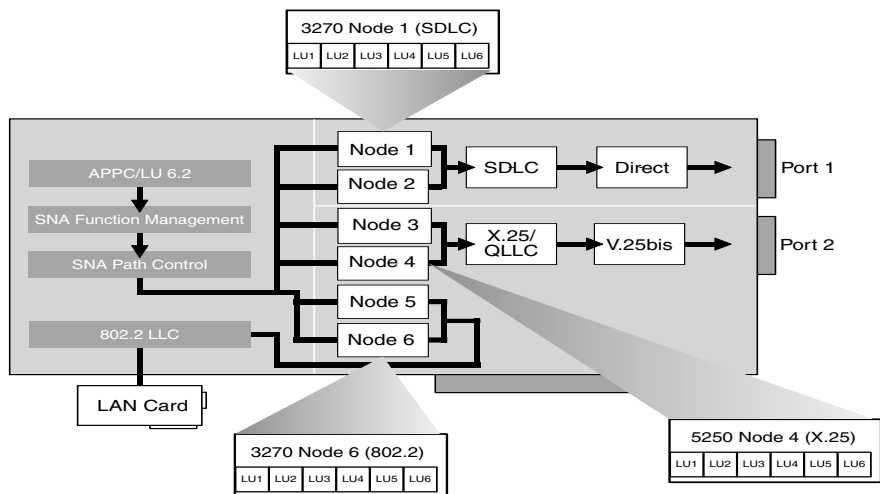
Eicon SNA Gateway's SNA Resource Manager controls the definition and allocation of all SNA resources. These resources include Nodes and LUs.

Adding and Deleting SNA Resource Manager Items

The SNA Resource Manager's Nodes and LUs are manipulated from within the information window. After you select a component in the Navigator, click one of the items listed in the information window before you insert, delete, or modify them. Each time you make any changes to these resources, they *must* be stopped and restarted, with the ECSNA command, for the changes to take effect.

IBM Architecture

In IBM's architecture, the access point into the SNA network and to a host computer is the Logical Unit (LU). One or more LUs are always managed by a Node (Physical Unit or PU), which is generally implemented by a dedicated piece of equipment called the cluster controller. The gateway protocol software can emulate multiple cluster controllers on the same Eiconcard, requiring minimal overhead on the gateway PC. Each Eiconcard can emulate up to 32 Nodes (PUs), with up to 254 fully configurable LU definitions.



Node Configuration

Node configuration is where you define the characteristics of each SNA Node you want to activate on the gateway.

There are four Node types supported by Eicon SNA Gateway. Each Node type provides services required to manage and use a particular type of device.

Node Type	Description
Node Type 1.0	Defines support services for 5250 Display and Printer devices
Node Type 2.0	Defines support services for 3270 Display and Printer devices, LU 0, and dependent LU 6.2 types.
Node Type 2.1	Defines support for independent APPC/LU 6.2 types (peer-to-peer) and APPN Low Entry Networking (LEN Node).
Node Type 5494	Defines support for 5250 Display and Printer devices over SDLC, X.25/QLLC, and 802.2 LLC communication links.

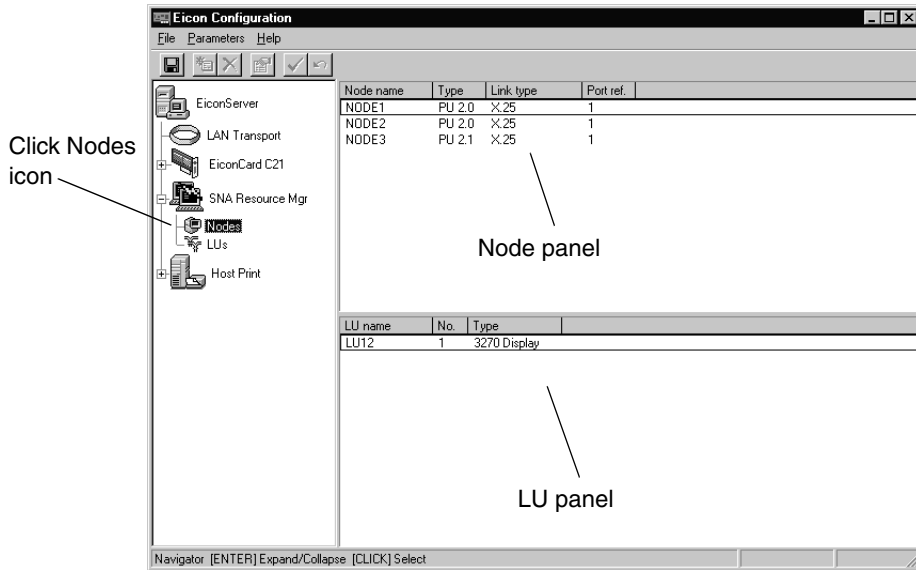
Important Notes

- When defining a Node, you must specify parameters to define the remote peer Node addressing information, and reserve space on the Eiconcard for Node resources.
- The Eiconcard can emulate up to thirty-two Nodes simultaneously. This depends on available Eiconcard memory and the memory requirements of the Node definition. Specifying a large Frame Size and many LUs increases the amount of memory required by the Node.
- Eicon SNA Gateway supports up to 32 concurrent connections per Eiconcard.
- When you define a Node with the Eicon Configuration Program, give it a unique name. It is recommended that this name correspond to the IBM host VTAM Node definition for easier overall network management.

Configuring Nodes

► To configure a node:

- 1 If necessary, double-click the *SNA Resource Mgr* icon to expand the branch. Click the *Nodes* icon to display a screen similar to the following:



- 2 Click the *Node* panel and then click the *Add New Item* button on the toolbar. The *Node Information* box appears.

The **Node Information** dialog box is shown. It contains the following fields and controls:

- Node** section:
 - Name: []
 - Type: PU 2.0
 - Link Type: X.25
 - Control unit address: C1
 - OK and Cancel buttons.
- Port ref:** 1
- Maxdata:** 265
- Pacing:** 7
- LU Term. Method:** UNBIND
- Identifier** section:
 - Block: 017
 - Node: 00000
 - ☐ Independent LU 6.2 Sessions
- Comment:** []
- X.25** section:
 - Type: QLLC
 - Virtual Circuit Type: Two Way
 - Network Level: 1980
- X.25 SVC Parameter** section:
 - Local DTE: []
 - Remote DTE: []
 - Facilities: []
 - User Data: []
 - ☐ Different Caller

3 Enter the **Node Name** and **Type**.

Note *When configuring a new Node, you may also select one of the Nodes already defined (if any) and click the Add New Item button. A new configuration box appears with all the previous Node's parameters. Change the Node Name and other Node parameters as required.*

4 Select the type of connection (**Link Type**) for which you want to define this new Node.

Note *Link types become available only if they have first been configured for an Eiconcard Port.*

The parameters on the bottom half of the Node Information box change depending on the **Link Type** selected. Refer to the online help of the Eicon Configuration Program for details on how to configure these parameters for your node.

5 Complete the parameters for the Node you are configuring and click *OK*.

If you need to modify a previously configured Node, double-click the appropriate Node name from the list of Nodes displayed in the Node panel.

To delete a Node, select it from the list and click the *Delete Item* button.

Note *Deleting a Node also deletes all its LUs.*

Important Notes

- When configuring Nodes for an AS/400 over X.25, the Call User Data parameter must be at least 11 bytes in length. Refer to the online help of the Eicon Configuration Program for specific information for building X.25 connections between an IBM host and the Eicon SNA Gateway.
- To add, modify, or delete an LU for the selected Node, click the LU panel on the bottom half of the screen. Click the *Add New Item* button to add an LU configuration panel, or click the *Delete Item* button to delete an LU. Double-click an existing LU to modify it. Refer to the "LU Configuration" in the next section for more details.

LU Configuration

Logical Units (LUs) act as ports through which an operator, printer, or host can communicate between one another. Each 3270 Node definition can support up to 254 logical units (LUs). Each 5250 Node definition can support up to 8 LUs per 5251 or 5294 controller emulation, up to 16 LUs per 5394 controller emulation, and up to 56 LUs per 5494 controller emulation.

Below is a list of supported LU types:

LU Type	Description
LU 0	Application to terminal (end user defined format)
LU 1	Application to printer (3270 SNA Character String)
LU 2	Application to display (3270 data stream)
LU 3	Application to printer (3270 data stream compatibility)
LU 4	Application to printer (5250 printer data stream)
LU 6.2	Application to application support (APPC dependent)
LU 7	Application to display (5250 data stream)

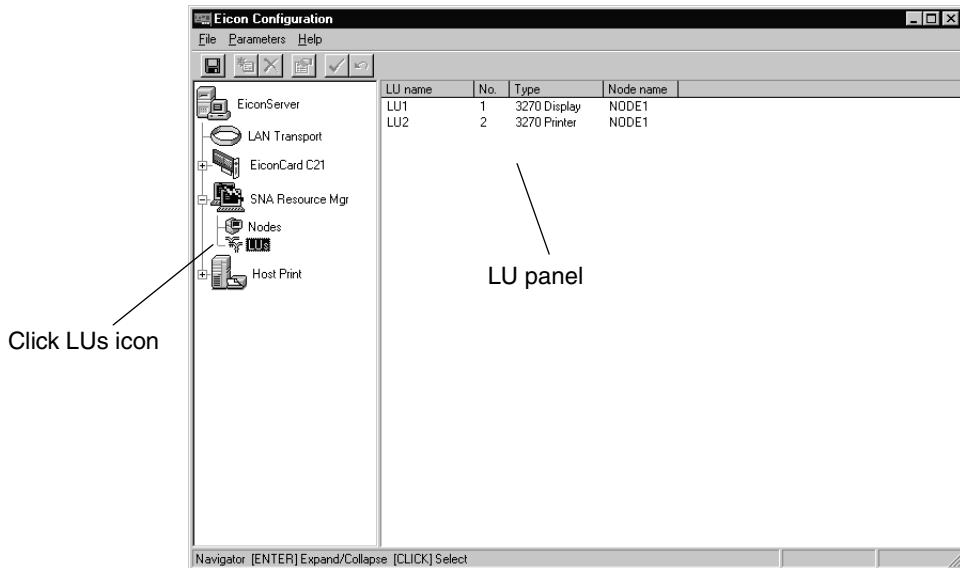
Note *LUs can be assigned non-consecutively. The LU address assignment of 5251 or 5294 controllers is from 0x00 to 0x1F (31 decimal), from 0x00 to 0x14 (20 decimal) for 5394 controllers, and from 0x00 to 0x37 for 5494 controllers. For 3270 Nodes addresses range from 0x01 to 0xFE (1 - 254).*

Logical Unit configuration allows you to define LUs for the system. Select the *LUs* component in the SNA Resource Manager tree to view a list of configured LUs.

Each LU you define must have a unique name on the system. The LU number, on the other hand, is only required to be unique for the Node it is assigned to.

► **To configure LUs:**

- 1 Click the *LUs* icon on the SNA Resource Manager branch.



- 2 Click the LU panel. Then click the *Add New Item* button. The *Logical Unit Information* box appears.

Logical Unit Information

Node Name:

Logical Unit (LU)

Name:

Number: ☐ Add range

Type:

Comments:

Note When configuring a new LU, you may also select one of the LUs already defined (if any) and click the *Add New Item* button. A new configuration box appears with all the previous LU's parameters. Change the LU name and configure the other parameters as required.

- 3 Enter all the related LU information and click *OK*.

Note When you define an LU, you must associate a Node with the LU using the *Node Name* parameter. At least one Node must be defined before you define an LU.

- 4 You may also configure more than one LU at a time by selecting the *Add Range* parameter.

A new set of parameters will become available at the bottom of the box.

- 5 Enter the number of LUs you need to create in the *Number of LUs* parameter. Set the *Prefix* according to the numbering convention of your preference.

To modify a previously configured LU, scroll through the list of LUs displayed, and double-click the appropriate LU name.

To delete an LU, select it from the list and click the *Delete Item* button.

Note *The Configuration program does not allow you to create LUs (independent LU 6.2) for Node Type 2.1. These are APPC resources (Local LU, Remote LU, Mode, Transaction Program), and are configured with the Eicon APPC Subsystem or Eicon APPC Toolkit applications. However, you must reserve space for these resources in the APPC/LU 6.2 configuration screen of the Eicon Configuration Program.*

Chapter Four

Host Print

THIS CHAPTER DESCRIBES THE HOST PRINTING FACILITIES OF THE SNA LAN Gateway, and how to configure them. Host Print enables SNA LAN Gateway to provide print queue services to client workstations on the LAN.

Host Print is supported by SNA LAN Gateway only.

About Host Print Services

Host Print enables SNA LAN Gateway to provide print queue services to client workstations on the LAN. It allows client print jobs to be directed to any shared print queue on the network. It is an optional service.

In the past, LAN users were required to run a printer emulation program from their workstations to output jobs to printers. With Host Print, the printer emulation function is transferred from the client workstation to the SNA LAN Gateway. The printer may be connected directly to the gateway, or may be attached as a LAN or workgroup printer. This reduces LAN traffic and improves printing efficiency, speed, and reliability.

Host Print uses the SNA Resource Manager module to allocate printer LU sessions. For details about defining LUs, refer to Chapter Three, “SNA Resource Manager.”

Configuring Host Print

Host Printing services are provided by the SNA LAN Gateway to enable direct host-to-LAN printing. When Host Printing services receives a print job, it translates and directs the 3270 or 5250 data stream to the specified network printer. Users can direct their print jobs to any print queue on the network.

Host print configuration enables you to set up the following features:

- Support for most printers:
 - PostScript
 - Hewlett Packard PCL type printers
 - Epson FX100 dot matrix type printers
 - Generic line printers
- 3270 (LU 1, LU 3) and 5250 (LU 4) printer data stream
- Background printing
- Support for multiple simultaneous printer sessions (limited by your SNA LAN Gateway)
- Printer Setup Strings

The following resources must be configured with the SNA Resource Manager module.

- One LU per Host Print session
- One or more Nodes for each Host Printer type

Note *For more details on configuring these network resources, see Chapter Three, “SNA Resource Manager.”*

Log File

The Host Print log file is named ECHP.LOG and is stored in the gateway's installation directory. When the log file reaches the specified maximum file size, it is deleted and a new file is created. You can activate or deactivate the log file feature from the Eicon Configuration Program.

User Requirements

Users must be aware of printer sessions that are available, which print queue the session uses, and which printer processes the session's output. Once these printer sessions have been established, users can print to LAN printers through Host Printing services.

Note *Each time you make any changes to the Host Print configuration, you must stop and then start Host Print services. To do so, use the following commands from the Windows 2000 command prompt:*

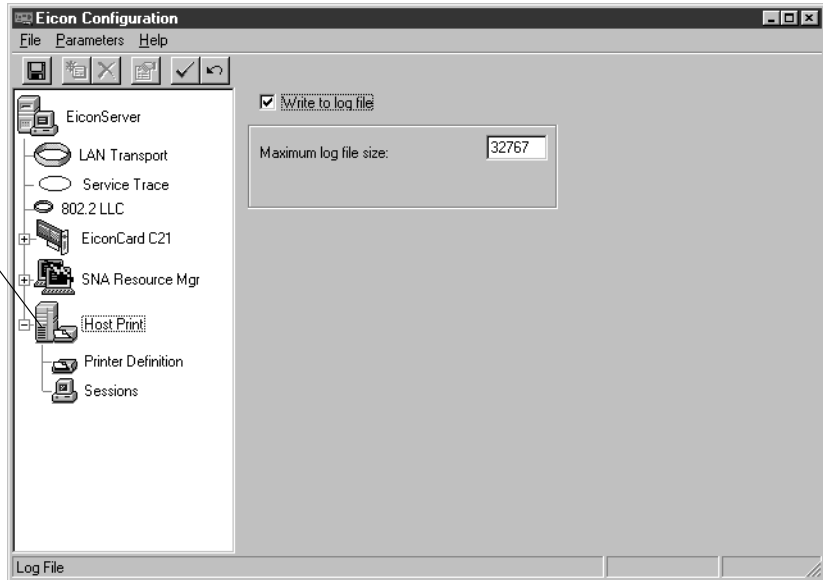
```
ECHP STOP  
ECHP START
```

For more information on the ECHP command, see "ECHP: Monitoring Host Print Sessions" on page 92.

► **To configure a basic setup for Host Print:**

- 1 Run the Eicon Configuration Program.
- 2 Select the *Host Print* component by clicking its icon from the Navigator. The Host Print panel appears:

Host Print
icon

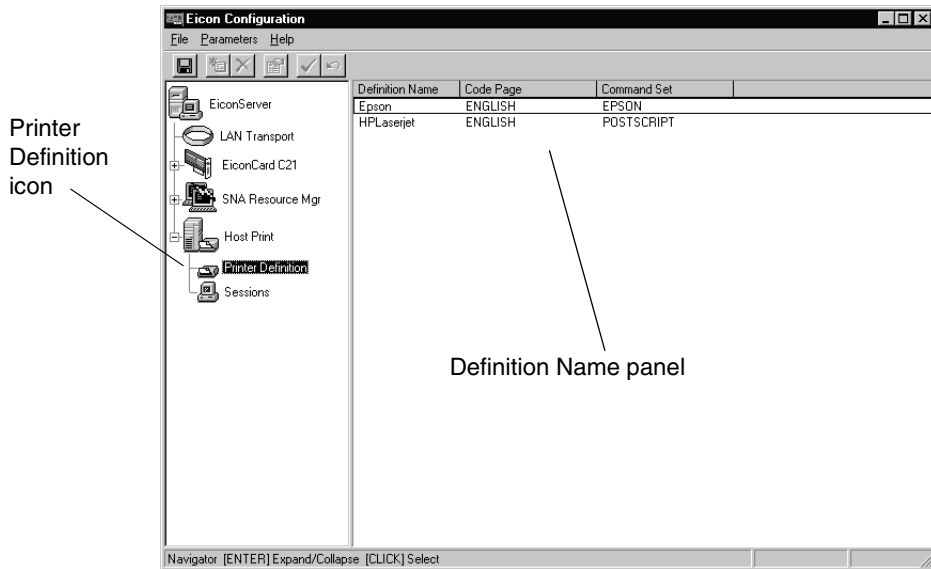


- 3 All parameters pertaining to the Host Print log file will be displayed. Set parameter values or change default values as required.

Note You can obtain extensive online help for any parameter by simply positioning your cursor in its text box and pressing the F1 key.

- 4 Click the *Confirm Entries* button to accept your settings. This will automatically update the Navigator.

- 5 Select the *Printer Definition* subcomponent to display its panel. The Printer Definition defines the printer type to be used by a particular print session.



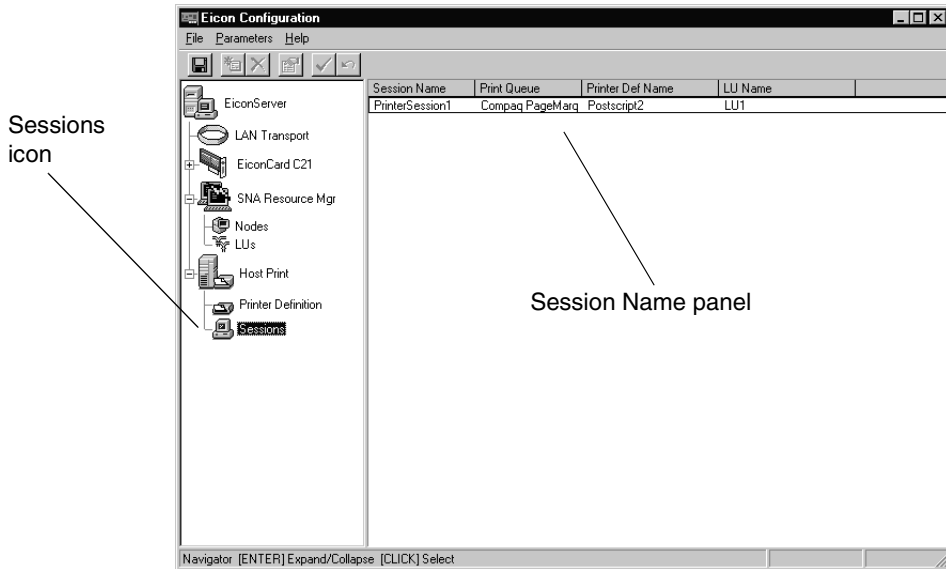
- 6 Click the *Add New Item* button. The *Printer Type Definition* box appears.

The 'Printer Type Definition' dialog box contains the following fields and controls:

- Definition name:
- Code page:
- Command set:
- Setup string:
- Page:
 - Length (rows):
 - Width (columns):
- Buttons: OK, Cancel

- 7 Enter the Printer name and the Code Page and Command Set it uses. Click *OK*.
- 8 If you need to modify a previously configured Printer Definition, double-click the Definition Name on the *Definition Name* panel. For more information on how to make changes, consult the online help.

- 9 Click the *Sessions* icon to display its panel. This subcomponent defines print sessions, print queues and the server you require for printing your job.



- 10 To add a session, click the *Add New Items* button. The *Session Parameters* box appears. From the *Session Parameters* box, set parameter values or change default values as required. Click *OK*.

The 'Session Parameters' dialog box is shown with three tabs: Global, Local Setting Page, and Host Setting Page. The 'Global' tab is active, showing the following fields:

- Session Name: [Text field]
- Print Queue: [Compaq PageMarq 2] (dropdown)
- LU Name: [LU1] (dropdown)
- Printer Def Name: [Epson] (dropdown)

The 'Local Setting Page' tab is also visible, showing:

- Copies: [1] (text field)
- Tab size: [8] (text field)
- ☐ Place hold on job
- ☐ Capture to a file

The 'Host Setting Page' tab is also visible, showing:

- Time Out: [0] (text field)
- ☐ Close job on end bracket
- Host Code Page: [US] (dropdown)
- ☐ Translate transparent data
- ☒ Sense code on error
- ☐ Sense code on null
- Print Null as: [32] (text field)

At the bottom are 'OK' and 'Cancel' buttons.

Chapter Five

Remote Operation

THIS CHAPTER DESCRIBES HOW TO USE SEVERAL EICONCARD commands for remote operations from a workstation. It also discusses remote configuration under Windows 2000.

Remote Eiconcard Commands

A number of Eiconcard commands can be run remotely from a LAN workstation to operate on a specific gateway PC. These commands fall into three groups:

- Status commands
- Administration commands
- NetView commands

Note *These Eiconcard commands are included with the Eiconcard LAN Client, a separate product. Refer to the Eiconcard LAN Client documentation for full details on using the remote commands listed here.*

Status Commands

Status commands allow workstation users to obtain status and statistics for any gateway to which they are attached (with ECLAN USE). This gives the user access to:

ECCARD STATUS

The ECCARD STATUS command provides a list of Eiconcards and their ports, detailing hardware configuration information based on the values entered in the Eiconcard Configuration Program.

ECMODULE

The ECMODULE command is used to examine the protocol information streaming through the gateway, and to provide statistical information about the various connections.

ECVER

ECVER scans the specified drive or folder for any Eicon Networks software, and displays the location and version number of that software.

Administration Commands

Administration commands allow workstation users to control dialing and SNA resources on any gateway to which they are attached (with ECLAN USE). The following commands can be issued:

ECDIALER

The ECDIALER command enables you to make and receive calls, display status information, and to hang up calls.

ECSNA

The ECSNA command enables you to create, configure, activate, and deactivate SNA Nodes and logical Units.

Note *Install these commands with caution. Since they allow direct control of the gateway functions, inappropriate use of these commands may interfere with the operation of the gateway. For example, the ECSNA command has options that allow it to start, stop, and reconfigure Nodes. Any one of these options could interrupt gateway operations for other users on the LAN.*

The best way to make these commands accessible on the LAN is to install them in a protected folder on the file server. This gives only authorized users easy access to them from anywhere on the LAN.

NetView Commands

NetView commands enable you to use Eicon's SNA network management support (Netview Support must be configured on the gateway PC).

ECNETV

ECNETV is the SNA Network Management Support Console. It runs from a Windows Command Prompt, or a DOS or OS/2 command line. It enables you to build and send operator-generated alerts, display Response-Time monitor (RTM) and RECFMS statistic data displays, and capture RTM and RECFMS data to disk or printer. It emulates the TEXT mode feature of the IBM 3274/3174 control unit.

ECRUNCMD

ECRUNCMD is a DOS or OS/2 application that is written specifically to interface with NetView's RUNCMD. It allows a host terminal to use NetView or Net/Master to issue commands on the gateway or a workstation.

Remote Configuration

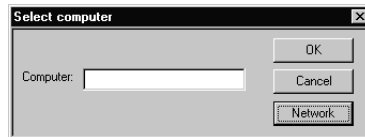
It is possible to use the Eicon Configuration Program to configure the Eicon SNA Gateway from a remote system. You can do so:

- From a remote PC on the LAN (you must have administrator rights to both the gateway and the remote PC)
- From another Eicon SNA Gateway on the LAN

Both systems must be running a Windows-based operating system.

► **To configure the gateway PC from a remote PC:**

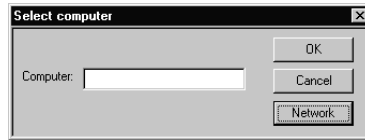
- 1 Open Explorer and locate the gateway PC on your LAN.
- 2 Double-click the icon for the gateway PC. Locate the installation directory for the Eicon SNA Gateway software (the default is C:\EICON).
- 3 Right-click the installation directory icon and select *Map Network Drive* from the pop-up menu. The Map Network drive box appears.
- 4 Choose a drive letter that is not in use and click *OK*.
- 5 Open the newly-assigned drive. A window containing the contents of the gateway installation directory appears.
- 6 Run the Eicon Configuration Program (the file name is ECADMIN.EXE). The Eicon Configuration Program appears, but the Navigator is blank.
- 7 Select the option *Select Computer* from the File menu. The Select Computer box appears.



- 8 Enter the Windows 2000 Server name of the gateway PC and click *OK* (this name is visible in the Computer Name parameter in the Eicon Configuration Program). The configuration of the gateway PC appears in the Navigator.
- 9 You can now modify the configuration of the gateway PC. Click the *Save* button and close the program when done.

► **To configure the gateway PC from another Eicon SNA Gateway:**

- 1 Run the Eicon Configuration Program.
- 2 Select the option Select Computer from the File menu. The Select Computer box appears.



- 3 Enter the Windows 2000 Server name and click *OK* (this name is visible in the Computer Name parameter in the Eicon Configuration Program).
- 4 A second copy of the Eicon Configuration Program appears, with the name of the gateway PC in the title bar. You can now modify the configuration of the gateway PC. Click the *Save* button and close the program when done.

Chapter Six

Eiconcard Commands

THIS CHAPTER PRESENTS THE COMMAND LINE UTILITIES FOR THE Eiconcard in alphabetical order. It explains how each command is used and defines all associated parameters. Issue these commands from the command line prompt on your gateway PC.

Overview of the Command Line Utilities

The command line utilities described in this chapter are briefly summarized below. Commands are described in separate sections which are presented in alphabetical order in this chapter.

ECADMIN

This command starts the Eicon Configuration Program. You can also start the Eicon Configuration Program from the Start menu or from the Control Panel.

ECCARD

The ECCARD START command loads the ELMs (Eicon Loadable Modules) or ERMs (Eicon Relocatable Modules) and starts the Eiconcard. ECCARD can also be used to stop the Eiconcard, view its status, and dump the contents of its memory to a file for analysis.

ECDIALER

This command is used to control the Eiconcard dialer and physical layer connections using internal or external modems. ECDIALER instructs the Eiconcard to make calls, answer calls, and to display status information.

ECHP

This command is used to start, stop and view the status of host print sessions.

ECMODULE

If you need to monitor the data communications traffic going through the gateway PC, ECMODULE lets you analyze different levels of protocols. ECMODULE is not required to run the gateway PC; it is a diagnostic tool.

The ECMODULE command is explained in detail in “ECMODULE Command” on page 98.

ECNCBLOG

ECNCBLOG is a diagnostic utility used to trace NCBs (Network Control Blocks) sent to the Eiconcard.

ECSERVER

ECSERVER (Eiconcard LAN Server) allows the gateway PC to provide communications services to workstations on the local area network (LAN).

ECSNA

This command is used to start, stop and view the status of SNA resources (nodes and Logical Units) on the Eiconcard.

ECVER

The ECVER command scans your network server or local hard drive for any Eicon Networks software.

ECCARD: Starting the Eiconcards

Executable	ECCARD.EXE		
Purpose	Starts, stops, and monitors the Eiconcard and its associated protocols.		
Commands	ECCARD	START	<div> <div>[/Eiconcard <i>n</i>] [/Mail <i>m</i>]</div> <div>[/Ncb <i>n</i>] [/Show] [/Flash]</div> </div> <div>START /Port <i>p</i> <i>portname</i></div> <div>STOP [/Eiconcard <i>n</i>] [/Yes]</div> <div>STOP /Port <i>p</i> <i>portname</i> [/Yes]</div> <div>DUMP /Eiconcard <i>n</i></div> <div>[/Binary <i>dumpfile</i>] [/Yes]</div> <div>LIST [/Eiconcard <i>n</i>]</div> <div>STATUS [/Eiconcard <i>n</i>]</div>
Parameters	START	Starts the specified Eiconcard or port, and all X.25 and Frame Relay ports with the Auto-Activate Ports option selected. If no Eiconcard is specified, all Eiconcards are started. All configuration information is taken from the registry.	
	STOP	Stops the specified Eiconcard or port. Stopping the last or only port on an Eiconcard <i>does not</i> stop the Eiconcard itself. You must use the command ECCARD STOP to stop the Eiconcard.	
	DUMP	Dumps Eiconcard memory to disk. Using ECCARD DUMP disconnects any active connections and stops only the specified Eiconcard.	
	LIST	Displays information on each Eiconcard protocol executable as if it were started, but does not actually run the executable.	
	STATUS	Provides information on the Eiconcard(s).	
	/Eiconcard <i>n</i>	Indicates the number (<i>n</i>) of the Eiconcard to start, stop, or dump when you have more than one Eiconcard installed in your gateway PC. This parameter is mandatory only with the DUMP option. For other options, if it is not specified, the action is performed on all Eiconcards.	
	/Mail <i>m</i>	The size (<i>m</i>) of the MAIL trace buffer on the Eiconcard, in kilobytes, ranging from 1 to 64. This is used to perform an internal mail trace when directed to do so by a representative of Eicon Networks Customer Services.	

<code>/Ncb <i>n</i></code>	The size (<i>n</i>) of the NCB trace buffer on the Eiconcard, in kilobytes, ranging from 1 to 64. This is used to perform an internal NCB trace when directed to do so by a representative of Eicon Networks Customer Services.
<code>/Show</code>	Displays detailed information on each Eiconcard protocol module.
<code>/Port <i>p</i> <i>portname</i></code>	Indicates the port number (<i>p</i>) or the port name (<i>portname</i>) of the Eiconcard to start or stop. This parameter is mandatory if acting on a specific port.
<code>/Yes</code>	Suppresses “Y/N” messages from the ECCARD STOP or ECCARD DUMP commands. This is useful for batch files.
<code>/Binary <i>dumpfile</i></code>	The Eiconcard dump filename if the default DUMP*.* file is not used. Specify the full path if the file is not in the current directory.

Auto-Activate Ports

Each X.25 or Frame Relay port that you configure as Auto-Activate is automatically started when ECCARD START is issued. This option saves you having to start each port individually with the ECCARD START /P command.

Using **ECCARD**

The following examples show how the different ECCARD options can be used.

ECCARD START

The ECCARD START command starts the specified Eiconcard or port. When you start an Eiconcard all X.25 and Frame Relay ports are automatically started unless you turn off the Auto-activate option (see previous topic).

Consider these examples:

```
ECCARD START
```

Starts all Eiconcards in the gateway PC.

```
ECCARD START /SHOW
```

Starts all Eiconcards and displays each software module as it is loaded onto the Eiconcard.

```
ECCARD START /E 4
```

Starts Eiconcard #4.

ECCARD STOP

Stops the specified Eiconcard or port. Stopping an Eiconcard halts all ports on it. Any active connections are lost. Stopping the last or only port on an Eiconcard does not stop the Eiconcard itself; you must explicitly stop it.

Examples

```
ECCARD STOP /E 3
```

Stops Eiconcard #3 and displays the following:

```
Do you really want to stop CARD 3? (Y/N) Y
Eiconcard 3 stopped.
Command completed successfully.
```

```
ECCARD STOP /E 2 /Y
```

Stops Eiconcard #2, and suppresses the Yes/No message:

```
Eiconcard 2 stopped.
Command completed successfully.
```

ECCARD DUMP

The DUMP command saves the contents of Eiconcard memory to disk for later analysis. Running ECCARD DUMP disconnects all active connections through the gateway and stops the Eiconcard.

If you are having trouble establishing a connection and are unable to find the source of the problems, a DUMP can be useful. In most cases, the DUMP is done under the advice or supervision of an Eicon Networks representative. The DUMP file can then be analyzed, and a solution found to your problem.

If you are dumping the contents of an Eiconcard for the first time, the default filename is DUMPx.001, where *x* is the number of the Eiconcard. For each subsequent dump, the file extension is incremented by 1: DUMP1.001, DUMP1.002, DUMP1.003, etc. If you delete all the DUMP files from the target directory, the counter will restart at 001.

Example

```
ECCARD DUMP /E 2 /B TESTDUMP.DMP
```

Dumps Eiconcard #2 to a file called TESTDUMP.DMP.

ECCARD LIST

The ECCARD LIST command displays information on each Eiconcard protocol executable as if it were being started, but does not actually run the executable. This is useful to determine if the right software will be started based on the configuration selected.

Example

```
ECCARD LIST
```

ECCARD STATUS

The ECCARD STATUS command provides a list of Eiconcards and their ports, detailing hardware configuration information based on the values entered in the Eiconcard configuration file.

When you issue the ECCARD STATUS command, detailed information about the Eiconcard is displayed. The following is a sample display:

```

Eiconcard Configuration :
Card Type      ID      Status      PCB      IO Port  IRQ  Address
-----
1      C21      BAB152C7  LOADED      800268.1    210    3      n/a

Eiconcard Port mapping :
Card  Port  Port name      Protocol
-----
1      01    P1              X25

Eiconcard Memory status :
Card Type      Free      Total
-----
1      C21      293 K      512 K

Command completed successfully.

```

The following table explains the headings in this display.

Parameter	Description
Card	Eiconcard card number.
Type	Type of Eiconcard installed in the gateway PC and configured by the Eicon Configuration Program.
ID	Unique identifier hard-coded on the Eiconcard. (<i>Not applicable to Eiconcard S50/S51/S52</i>).
Status	Status of the Eiconcard. Refer to the table on the next page for a detailed list of all the different Eiconcard status values.
PCB	Printed Circuit-Board number: This is an identification code showing the revision number of the Eiconcard in use. If the software does not detect a PCB number, you must check the Eiconcard itself for a physically engraved number.
I/O Port	I/O port memory address of the Eiconcard. Make sure that no other peripheral is using this I/O port address.
IRQ	Interrupt Request Level used by the Eiconcard. Make sure that no other peripheral is using this IRQ on an ISA bus (AT or PC bus).
Address	Memory segment used by the Eiconcard. Make sure that no other peripheral is using this memory segment. (<i>Not applicable to Eiconcard C20/C21</i>).
Port	Port number on the specified Eiconcard.
Port Name	The name of the port on the specified Eiconcard.
Protocol	The protocol currently in use by the specified port.
Free	The available RAM Memory on the Eiconcard.
Total	The RAM Memory capacity of the Eiconcard.

The following table lists the different Eiconcard status values:

Status Value	Description
DETECTED	The Eiconcard I/O Port Address and Memory Segment has been properly configured, but the Card Identification (type) or IRQ test has failed or has not yet been performed.
DUMPING	The contents of the Eiconcard's memory is currently being dumped to disk.
HALTED	All Eiconcard tests have been completed successfully, the hardware settings are correct, and the size of the Eiconcard's memory has been determined. The Eiconcard has now been stopped, and must be restarted to be used.
IDLE	This Eiconcard has not been properly configured. Make sure you have the correct I/O, IRQ, and Memory Segment values configured for this Eiconcard.
LOADED	The Eiconcard has been started, is functioning, and can be used for communication, assuming the Ports have been activated.
LOADING	The necessary protocol executables are being started onto the Eiconcard.
TESTING	An Eiconcard test is now in progress, or is in an intermediate state of the start process.
TESTED	The Eiconcard has tested successfully.

Examples

The following example illustrates how to use ECCARD STATUS.

```
ECCARD STATUS
```

Provides detailed information on all Eiconcards in the gateway PC.

ECCARD Error Level Values

ECCARD returns the following error levels.

Error Level	Description
0	SUCCESS. The command was completed successfully.
1	WARNING. A warning was displayed while the command was running. The command was executed anyway.
2	PARTIAL. The command was partially completed. (This occurs when using the ECCARD START command to run all Eiconcards at once, but some Eiconcards could not be started.)
3	ABORT. The CONTROL-C or CONTROL-Break key combinations were pressed while an ECCARD command was executing, or the command was canceled from an input prompt such as: <i>Binary dump file DUMPCARD.DAT already exists, do you want to overwrite? (Y/N) N.</i>
4	FAILED. The command failed. For ECCARD START (without /Eiconcard <i>n</i>), this happens when ALL the Eiconcards specified in the Eiconcard configuration file could not be started.

ECDIALER: Using a Modem

Executable	ECDIALER.EXE
Purpose	Dials, hangs up, monitors, and configures the Eiconcard dialers. This command can also be used to determine the state of the hardware link.
Preloaded Executables	You must have already run ECCARD START for this executable to run successfully.
Commands	Use the command appropriate to your operating system.
	<pre> ECDIALER STORE [/Main n] [/ALternate n] [/NType t] [/NPlan p] [/SAddr a] [/SType t] [/Tns t] [/BCTYPE b] [/Port n portname] [/Outfile f] ECDIALER DIAL [/NUmber n] [/NType t] [/NPlan p] [/SAddr a] [/SType t] [/Tns t] [/BCTYPE b] [/Port n portname] [/Outfile f] ECDIALER EXEC /File script [/Port n portname] [/Outfile f] ECDIALER ANSWER /Enable /Disable [/Port n portname] [/Outfile f] ECDIALER HANGUP [/Port n portname] [/Outfile f] ECDIALER STATUS [/Port n portname] [/Outfile f] ECDIALER LINE /ON /OFF [/Port n portname] [/Outfile f] </pre>
Parameters	<p>ANSWER Use this option for all dialer types except Direct. Enables or disables the dialer from answering incoming calls. For ISDN cards configured as a 2B terminal, where both ports can accept the incoming call, the call will always be answered by port 1.</p> <p>DIAL Use this option for Hayes AT, ISDN, and V.25bis dialer types. Dial the telephone number specified with the /NU parameter. If no number is specified, dial the Main (or Alternate number if there is one) that has been STOREd. If the <i>Retry</i> parameter has been enabled in the Eicon Configuration Tool, then dialing is repeated until successful or the <i>Retry</i> counter has expired.</p> <p>EXEC Supported by Hayes AT dialers only. Execute a script for programming an external modem.</p>

**Parameters
(continued)**

HANGUP	Use this option for all dialer types except Direct. Hangs up the current connection.
LINE	Defines the setting of the Data Rate Select (DRS) signal on an RS-232 interface (Direct Dialer only). Not supported by ISDN dialers.
STATUS	Performs the same function as the ECMODULE DIALER STATUS command.
STORE	Use this option for Hayes AT, ISDN, and V.25bis dialer types. Store the primary or alternate telephone number to call. The options you specify with this command override the settings in the Eicon Configuration Tool command file. Note: ISDN users do not have the option to store an alternate number.
/ALternate <i>n</i>	This parameter is not available for ISDN dialer types. Sets the alternate telephone number. This is dialed when the ECDIALER DIAL command is issued and the primary number dialed is busy.
/Bctype <i>bearer</i>	ISDN only. Possible values: 64K, 56K, or Packet.
/Disable	Disable the dialer from answering any incoming calls.
/Enable	Enable the dialer to answer any incoming calls.
/File <i>script</i>	Filename of the ECDIALER script file to execute. Only valid for AT dialers.
/Main <i>n</i>	Sets the main telephone number. This is the first number dialed when the ECDIALER DIAL command is issued without a number parameter. On ISDN this option is not needed for packet calls.
/NUmber <i>n</i>	Dial the override number <i>n</i> , regardless of what is stored as the Primary or Alternate phone number. On ISDN this option is not needed for packet calls.
/ON	Switches the Data Rate Select (DRS) line to ON. This option is not available for ISDN Eiconcards.
/OFF	Switches the Data Rate Select (DRS) line to OFF. This option is not available for ISDN Eiconcards.
/Outfile <i>f</i>	Write the display to a file. Use a valid name for <i>f</i> . Note: When used on a script file, the PAUSE command will not function.
/Port <i>p</i> <i>portname</i>	The Eiconcard port or portname through which you want to dial. Port 1 is the default.

**Parameters
(continued)**

<code>/NType type</code>	Number type. Possible values are: Unknown, International, NAtional, NEtSpecific, Subscription, Abbreviated. This list varies from one country to another. (<i>ISDN dialer only.</i>)
<code>/NPlan plan</code>	Numbering plan. Possible values are: Unknown, ISDN, Data, Private, Telex, NAtional. This list varies from one country to another. (<i>ISDN dialer only.</i>)
<code>/SAddr subaddr</code>	The subaddress of the terminal being called. (<i>ISDN dialer only.</i>)
<code>/SType subtype</code>	Possible values: NSAP, USER, OSI. This list varies from one country to another. (<i>ISDN dialer only.</i>)
<code>/Tns t</code>	Transit Network Selection. Allows you to specify which long-distance carrier will be used to carry the call. (<i>ISDN dialer only.</i>)

You can use ECDIALER to make and receive calls, display status information, and hang up the line.

ECDIALER also supports the use of modem scripts that tell your dialer what information to send in response to specific prompts. Scripts can be written to automate a wide range of communications functions. Use the ECDIALER Script facility for AT Dialer and programming of external asynchronous/synchronous Hayes compatible modems.

Using ECDIALER

The following examples illustrate how to use the ECDIALER command.

```
ECDIALER STORE /P 2 /M 5551212  
ECDIALER DIAL /P 2
```

Stores the primary phone number for port #2 and then dials it.

```
ECDIALER STORE /P 3/M 5551212 /AL 18005550000  
ECDIALER DIAL /P 3
```

Instructs the dialer associated with port 3 to dial 555-1212, and if that number is occupied to dial 1-800-555-0000.

```
ECDIALER ANSWER /E /P 3
```

Enables port #3 to accept incoming calls.

```
ECDIALER EXEC /F LOGON.SCR /P 2
```

Executes the script file, LOGON.SCR, on the dialer connected to port 2 on the gateway.

ECDIALER and ISDN

This section contains information about using the ECDIALER command to control the Eiconcard with ISDN support.

Using ECDIALER with NI-1 (North America)

This section describes how to make an ISDN connection to an NI-1 switch.

X.25 on the D-Channel

If a port on the Eiconcard has been configured as a D-channel to carry X.25 data, the only ECDIALER command that you can use on that port is the ECDIALER STATUS command.

ISDN NI-1 Parameters

The table below lists all the ISDN NI-1 specific parameters for ECDIALER.

Parameter	Explanation
<i>/BType bearer</i>	Defines the Bearer Capability (i.e., the information-transfer rate and mode). Possible values are 56K, 64K (default), or Packet. 56K and 64K are for circuit-switched services, while Packet is the equivalent of 64K for packet-switched services.
<i>/Main n</i>	Stores the main telephone number. This is the first number dialed when you issue the ECDIALER DIAL command without a number parameter. This option is not required for packet calls when connecting to ISDN through an NI-1 type switch.
<i>/NUnber n</i>	Dials the number specified.
<i>/NType type</i>	Specifies the remote number type, Abbreviated, International, National, Netspecific, Subscriber, or Unknown (default), assigned to the called party by its local telephone company.
<i>/NPlan plan</i>	Numbering plan for the ISDN dialer. Possible values are Unknown, ISDN (default), Data, Private, Telex, or National.
<i>/SAddr subaddr</i>	Provides the subaddress to further identify the remote terminal on the ISDN Basic Rate Interface. If two terminals share the same directory number, the subaddress identifies which terminal will answer a particular incoming call.
<i>/SType subtype</i>	The types of subaddress used, NSAP (default) or User. If you include this option, you must also use the <i>/SAddr</i> option.

Parameter	Explanation
<code>/Tns tns</code>	The transit network selector allows you to specify the transit carrier to be used on long-distance calls.
<code>/Port p portname</code>	The Eiconcard port number or port name through which you want to dial. Port 1 is the default. With ISDN connections, this refers to the Eiconcard channel you are using.

ECDIALER STORE

```
ECDIALER STORE    [/Main n] [/ALternate n] [/NType t] [/NPlan p]
                  [/SAddr a] [/SType t] [/Tns t] [/BCType b]
                  [/Port n|portname] [/Outfile f]
```

ECDIALER STORE replaces whatever value was previously stored.

ECDIALER DIAL

```
ECDIALER DIAL     [/NUnber n] [/NType t] [/NPlan p] [/SAddr a]
                  [/SType t] [/Tns t] [/BCType b]
                  [/Port n|portname] [/Outfile f]
```

To dial a number that has been configured or that has already been stored using the ECDIALER STORE command, issue the following command:

```
ECDIALER DIAL     /P port
```

ECDIALER ANSWER

```
ECDIALER ANSWER   /Enable | /Disable /Port port
```

Enables or disables the dialer to answer any incoming calls. Answer Mode allows a correctly configured port to answer a call.

ECDIALER HANGUP

```
ECDIALER HANGUP   /Port port
```

This command allows you to hangup an ISDN connection on the specified port.

ECDIALER STATUS

```
ECDIALER STATUS   /Port port
```

ECDIALER STATUS displays summary information on all ports. Specify a port name or number to see detailed information about a specific port.

Using ECDIALER with TPH1962 (Australia)

This section describes how to make an ISDN connection to the TPH1962 switch type used in Australia.

X.25 on the D-Channel

If a port on the Eiconcard has been configured as a D-channel to carry X.25 data, the only ECDIALER command that you can use on that port is the ECDIALER STATUS command. No other ECDIALER commands are supported for X.25 D-channels.

ISDN TPH1962 Parameters

The following table lists all the ISDN TPH1962 specific parameters for ECDIALER.

Parameter	Explanation
<i>/Main n</i>	Stores the main telephone number. This is the first number dialed when you issue the ECDIALER DIAL command without a number parameter. This option is not required for packet calls when connecting to ISDN through a TPH1962 type switch.
<i>/NUnber n</i>	Dials the number specified, regardless of what is stored as the main telephone number.
<i>/NType type</i>	Specifies the remote number type, Abbreviated, International, National, Netspecific, Subscriber, or Unknown (default), assigned to the called party by its local telephone company.
<i>/NPlan plan</i>	Numbering plan for the ISDN dialer. Possible values are Unknown, ISDN (default), Data, Private, Telex, or National.
<i>/SAddr subaddr</i>	Provides the subaddress to further identify the remote terminal on the ISDN Basic Rate Interface. If two terminals share the same directory number, the subaddress identifies which terminal will answer a particular incoming call.
<i>/SType subtype</i>	The types of subaddress used, NSAP (default) or User. If you include this option in the command, you must also use the <i>/SAddr</i> option.
<i>/BCTYPE bearer</i>	Defines the Bearer Capability (i.e., the information-transfer rate and mode). Possible values are 56K, 64K (default), or Packet. 56K and 64K are for circuit-switched services, while Packet is the equivalent of 64K for packet-switched services.
<i>/Port p portname</i>	The Eiconcard port number or port name through which you want to dial. Port 1 is the default. With ISDN connections, this refers to the Eiconcard channel you are using.

ECDIALER STORE

```
ECDIALER STORE      [/Main n] [/ALternate n] [/NType t] [/NPlan p]
                   [/SAddr a] [/SType t] [/Tns t] [/BCtype b]
                   [/Port n|portname] [/Outfile f]
```

ECDIALER STORE permanently replaces whatever value was previously configured or stored.

ECDIALER DIAL

```
ECDIALER DIAL      [/NUnber n] [/NType t] [/NPlan p] [/SAddr a]
                   [/SType t] [/Tns t] [/BCtype b]
                   [/Port n|portname] [/Outfile f]
```

To dial a number that has been configured or that has already been stored using the ECDIALER STORE command, enter the following command:

```
ECDIALER DIAL /P port
```

ECDIALER ANSWER

```
ECDIALER ANSWER    /Enable | /Disable /Port port
```

Enables or disables the dialer to answer any incoming calls. Answer Mode allows a correctly configured port to answer a call.

ECDIALER HANGUP

```
ECDIALER HANGUP    /Port port
```

This command allows you to hangup an ISDN connection on the specified port.

ECDIALER STATUS

```
ECDIALER STATUS    /Port port
```

ECDIALER STATUS displays summary information on all ports. Specify a port name or number to see detailed information about a specific port.

Using ECDIALER with 5ESS (AT&T)

This section describes how make an ISDN connection to the 5ESS switch type.

ISDN AT&T 5ESS Parameters

The following table lists all the ISDN AT&T 5ESS specific parameters for ECDIALER:

Parameter	Explanation
<code>/Main n</code>	Stores the main telephone number. This is the first number dialed when you issue the ECDIALER DIAL command without a number parameter. This option is not required for packet calls when connecting to ISDN through a 5ESS type switch.
<code>/NNumber n</code>	Dials the number specified, regardless of what is stored as the main telephone number.
<code>/SAddr subaddr</code>	Provides the subaddress to further identify the remote terminal on the ISDN Basic Rate Interface. If two terminals share the same directory number, the subaddress identifies which terminal will answer a particular incoming call.
<code>/SType subtype</code>	The types of subaddress used, NSAP (default) or User. If you include this option in the command, you must also use the <code>/SAddr</code> option.
<code>/BType bearer</code>	Defines the Bearer Capability (i.e., the information-transfer rate and mode). Possible values are 56K, 64K (default), or Packet. 56K and 64K are for circuit-switched services, while Packet is the equivalent of 64K for packet-switched services.
<code>/Port p portname</code>	The Eiconcard port number or port name through which you want to dial. Port 1 is the default. With ISDN connections, this refers to the Eiconcard channel you are using.

ECDIALER STORE

```
ECDIALER STORE    [/Main n] [/ALternate n] [/NType t] [/NPlan p]
                  [/SAddr a] [/SType t] [/Tns t] [/BType b]
                  [/Port n|portname] [/Outfile f]
```

ECDIALER STORE permanently replaces whatever value was previously configured or stored.

ECDIALER DIAL

```
ECDIALER DIAL      [/NNumber n] [/NType t] [/NPlan p] [/SAddr a]  
                  [/SType t] [/Tns t] [/BCtype b]  
                  [/Port n|portname] [/Outfile f]
```

To dial a number that has been configured or that has already been stored using the ECDIALER STORE command, enter the following command:

```
ECDIALER DIAL /P port
```

ECDIALER ANSWER

```
ECDIALER ANSWER    /Enable | /Disable /Port port
```

Enables or disables the dialer to answer any incoming calls. Answer Mode allows a correctly configured port to answer a call.

ECDIALER HANGUP

```
ECDIALER HANGUP    /Port port
```

This command allows you to hangup an ISDN connection on the specified port.

ECDIALER STATUS

```
ECDIALER STATUS    /Port port
```

ECDIALER STATUS displays summary information on all ports. Specify a port name or number to see detailed information about a specific port.

Using ECDIALER with EuroISDN

This section describes how make an ISDN connection to the EuroISDN switch type.

X.25 on the D-Channel

If a port on the Eiconcard has been configured as a D-channel to carry X.25 data, the only ECDIALER command that you can use on that port is the ECDIALER STATUS command. No other ECDIALER commands are supported for X.25 D-channels.

ISDN EuroISDN Parameters

The following table lists all the ISDN EuroISDN parameters for ECDIALER:

Parameter	Explanation
<i>/Main n</i>	Stores the main telephone number. This is the first number dialed when you issue the ECDIALER DIAL command without a number parameter. This option is not required for packet calls when connecting to ISDN through an EuroISDN type switch.
<i>/NUmber n</i>	Dials the number specified, regardless of what is stored as the main telephone number.
<i>/NType type</i>	Specifies the remote number type, Abbreviated, International, National, Netspecific, Subscriber, or Unknown (default), assigned to the called party by its local telephone company.
<i>/NPlan plan</i>	Numbering plan for the ISDN dialer. Possible values are Unknown, ISDN (default), Data, Private, Telex, or National.
<i>/SAddr subaddr</i>	Provides the subaddress to further identify the remote terminal on the ISDN Basic Rate Interface. If two terminals share the same directory number, the subaddress identifies which terminal will answer a particular incoming call.
<i>/SType subtype</i>	The types of subaddress used, NSAP (default) or User. If you include this option, you must also use the <i>/SAddr</i> option.
<i>/Tns tns</i>	The transit network selector allows you to specify the transit carrier to be used on long-distance calls.
<i>/Port p portname</i>	The Eiconcard port number or port name through which you want to dial. Port 1 is the default. With ISDN connections, this refers to the Eiconcard channel you are using.
<i>/Bctype bearer</i>	Defines the Bearer Capability (i.e., the information-transfer rate and mode). Possible values are 56K, 64K (default), or Packet. 56K and 64K are for circuit-switched services, while Packet is the equivalent of 64K for packet-switched services.

ECDIALER STORE

```
ECDIALER STORE    [/Main n] [/Alternate n] [/NType t] [/NPlan p]
                  [/SAddr a] [/SType t] [/BCTYPE b] [/Port n|portname]
                  [/Gateway g] [/Outfile f]
```

ECDIALER STORE permanently replaces whatever value was previously configured or stored.

ECDIALER DIAL

```
ECDIALER DIAL     [/Number n] [/NType t] [/NPlan p] [/SAddr a]
                  [/SType t] [/Tns t] [/BCTYPE b]
                  [/Port n|portname] [/Outfile f]
```

To dial a number that has been configured or that has already been stored using the ECDIALER STORE command, enter the following command:

```
ECDIALER DIAL /P port
```

ECDIALER ANSWER

```
ECDIALER ANSWER   /Enable | /Disable /Port port
```

Enables or disables the dialer to answer any incoming calls. Answer Mode allows a correctly configured port to answer a call.

ECDIALER HANGUP

```
ECDIALER HANGUP   /Port port
```

This command allows you to hangup an ISDN connection on the specified port.

ECDIALER STATUS

```
ECDIALER STATUS   /Port port
```

ECDIALER STATUS displays summary information on all ports. Specify a port name or number to see detailed information about a specific port.

ECDIALER Script Language

A modem script tells your dialer what information to send in response to specific cues. A script is like a program, and elaborate scripts can be written to automate a wide range of communications functions. ECDIALER script is used for the AT Dialer and programming of external asynchronous/synchronous Hayes compatible modems.

The ECDIALER Script feature supports most external modems. Use any ASCII text editor to create the script file.

Blank lines are accepted in the script. All commands must start in the first column.

Valid commands are as follows:

:label When you use a *GOTO label* command, the script jumps to the specified label and continues execution from there. A label is any alphanumeric ASCII string with a colon in the first position. The “—” (dash) and “_” (underscore) characters can also be used for the label.

***comment** Any script line starting with an asterisk (*) in the first column is treated as a comment, and ignored by the script. A comment is used only for your information.

CLOSE_COMM This command closes the Eiconcard port that is connected to the external modem. This does not hang up the modem. **CLOSE_COMM** must be the last statement executed when you are finished with the port.

DIAL number This command dials the specified number. Success or failure can be tested with the **IFERROR** statement. A **MATCH** command is commonly used directly after **DIAL** to look for the **CONNECT** message from the modem.

GOTO label This command causes processing of the script file to continue at the specified label. The label can be forward or backward, and can thus be used for looping.

IFERROR label This command causes execution of the script file to continue from the specified label if an error occurred during one of the following commands: **MATCH**, **DIAL**, **OPEN_COMM**, or **TYPE**. Use **IFERROR** immediately after these commands to test for errors.

MATCH string This command pauses execution of the script file until input is received that matches the specified string. For instance, a Hayes modem

usually returns “OK” to acknowledge a command. Use MATCH “OK” to wait for the “OK” string. The string must be enclosed in quotation marks. MATCH waits the number of seconds specified in a previous TIMEOUT command. Use IFERROR directly following MATCH to test for success or failure. This command reads and ignores any characters before the match is found or a timeout occurs.

OPEN_COMM This command initializes the Eiconcard for communication with the external modem. The initialization values for this command are specified with the five SET_xxxx commands. Success or failure is determined with the IFERROR command.

PAUSE Pauses execution of the script file until any key is pressed on the keyboard. This is useful when debugging a script.

PRINT string Displays the specified string on the screen.

SET_DATA_BITS n This command sets the number of data bits put into effect by a subsequent OPEN_COMM command. Valid values for “n” are 7 or 8 data bits. The default is 8 data bits.

This is the asynchronous data bit setting used by the Eiconcard Hayes dialer port to communicate with an external modem.

SET_PARITY n Selects the parity of the connection put into effect by a subsequent OPEN_COMM command. Valid values for n are: NO_PARITY, EVEN_PARITY, or ODD_PARITY. The default is NO_PARITY.

This is the parity setting used by the Eiconcard Hayes dialer port to communicate with an external modem.

SET_PORT n Specifies the Eiconcard port to use when communicating with a modem. SET PORT takes effect when an OPEN_COMM command is executed. Valid values for *n* range from 1 to 48. The default is 1.

SET_SPEED n Sets the bits per second (bps) rate put into effect by a subsequent OPEN_COMM command. Valid values are: 1200, 2400, 4800, 9600. The default is 2400 bps.

This is the speed setting used by the Eiconcard Hayes dialer port to communicate with an external modem.

SET_STOP_BITS n Selects the number of stop bits. Set *n* to 1 or 2 stop bits. By default, 1 stop bit is used. This command is not taken into account by

OPEN_COMM, but you must have the same stop bit setting as the computer to which you are connected. This is the stop bits setting used by the Eiconcard Hayes dialer port to communicate with an external modem.

TIMEOUT *n* This command sets the timeout value in seconds for the MATCH command. Default is 15 seconds.

TYPE *string | hex,...* This command sends a string to the modem. The string must be enclosed in quotation marks (single or double) and can include any text or hexadecimal value. If you need to insert control codes, enter them in hexadecimal. Here is an example of TYPE:

```
TYPE "ATAS",07,'ATDT5551212',0d
```

Success or failure of this command can be tested with the IFERROR command.

WAIT *n* This command causes the execution of the script file to pause for *n* seconds.

Modem Considerations (Hayes AT)

If the Dialer type is configured as “HAYES AT” in the ECCARD CONFIG command, certain parameters must be set on your external modem. The table below lists settings and modes to which a Hayes-compatible modem should be set in order to interoperate successfully with the gateway.

AT Command	Description
AT&F	Restores all factory defaults and deletes all stored numbers.
AT&C1	Sets the Data Carrier Detect (DCD) to track the data carrier from the remote modem. DCD is on when the data carrier is detected.
AT&D2 or D3	Sets the Data Terminal Ready (DTR) mode so that the modem hangs up, assumes command state, and disables auto-answer when an ON-to-OFF transition of DTR is detected.
AT&M1 or &Q1	This sets the modem to synchronous mode 1. The call placement is initiated using asynchronous methods, but the modem switches to synchronous operation when the connection is fully established. The modem returns to asynchronous mode when it detects an ON-to-OFF transition on the DTR interchange circuit.
AT&S1 or S2	Sets the Data Set Ready (DSR) to trade carrier. The DSR cannot be changed from this mode if the modem is operating in synchronous mode.

If the AT commands given above are not compatible with your modem, you should determine, from your modem's operating guide, the equivalent commands used to control the following parameters:

Parameter	Settings Required
DTR on/off	The Data Terminal Ready signal will be turned off to cause the modem to hang up. The modem should interpret DTR this way.
DSR on/off	The Data Set Ready signal is used to detect a connection. It should be turned on only when data is ready to be sent (modem negotiation complete).
Sync/Async mode	The modem must operate in asynchronous mode while in an off-line command state. It must operate in synchronous mode from the time the connection is fully established until the on-line data-transfer state is terminated.

The Request-To-Send/Clear-To-Send (RTS/CTS) delay interval value may also need to be adjusted. This value determines the delay time a modem uses before turning on CTS after detecting an OFF-to-ON transition on RTS.

The RTS/CTS delay interval can be adjusted by adjusting the modem's S26 register. If you are using a Hayes-compatible modem, this is achieved with the AT command:

```
ATS26=x
```

where x is the value of the delay interval in increments of 10 ms.

If you do not own a Hayes compatible modem, consult your modem's operating guide for directions on how to adjust the interval between detection of the Request-To-Send mode and enabling of the Clear-To-Send signal.

Sample Script

The ECDIALER script does three things:

- Initializes the Eiconcard for communications with the modem. This is done with the SET_PORT, SET_DATA_BIT, SET_SPEED, and finally the OPEN_COMM commands.
- Programs the modem.
- Calls the DATAPAC online service from Montreal. This is done with the Type "ATDT8614750" command. When a connection is established, the modem answers with a "CONNECT 2400" string.

The following is a sample script text for a Hayes-compatible modem. Use the sample as a base for your own script, but change the settings to ones appropriate for your own particular modem type.

```
*****
This script file is used to configure hayes-compatible modems.
*****
close_comm
set_port 3
set_speed 9600
set_parity NO_PARITY
set_data_bits 8
iferror bye_comm
print "Initialization successful "
wait 1
*****
The AT (Attention code) is examined by modems which support *
* auto bauding in order to determine the communications and *
* parity setting of the DTE device. Modems which do not *
* support auto bauding can only communicate at the configured *
* speed and parity setting. *
* Some modems may require that the Attention code be sent twice.*
* If this is the case, repeat the sending of the Attention code.
*****
type "AT",0d,0a
iferror bye_t1
timeout 15
match "OK"
iferror bye_m1
*****
* Programming modem *
*****
*** Initialize to factory settings ***
*****
type "AT&F",0d,0a
match "OK"
iferror FACTORY
*****
*** Set speaker volume to low ***
*****
type "ATL1",0d,0a
match "OK"
iferror ATFORM
*****
*** DCD setting AT&C1 ***
*** DCD is asserted by modem only ***
*** if a data carrier which meets ***
*** the modems suitable criteria ***
*** is present. On some modems ***
*** the factory setting for DCD ***
*** to remain on at all times ***
*** disregarding the ***
*** state of the data carrier. ***
*****
type "AT&C1",0d,0a
match "OK"
iferror TELCO
wait 1
*****
*** DTR Setting AT&D2 ***
*** Set modem to answer when DTR is ***
*** raised by the DTE and set to hangup*
*** to asynchronous command mode ***
*** when DTR switches from ON to OFF.**
*****
type "AT&D2",0d,0a
match "OK"
iferror TELCO
*****
*** ATSO = 1" ***
```

```

*** Set modem to answer on the first ring.
*****
type "ATS0=1",0d,0a
match "OK"
iferror TELCO
*****
*** Asyn/Sync Mode Selection  AT&M1 ***
***                                     ***
*** Call is initiated in asynchronous**
*** mode. The modem will automatically*
*** switch to synchronous mode once the*
*** telephone connection is established.*
*** The factory setting for most modems*
*** is asynchronous.                  ***
***                                     ***
*****
type "AT&M1",0d,0a
match "OK"
iferror TELCO
*****
*** DSR setting  AT&S1                ***
***                                     ***
*** DSR is controlled by the modem. ***
*** With this setting, DSR is asserted*
*** when the modem completes answer ***
*** tone detection and training. If***
*** the modem hangs up after dialing ***
*** and answer tone detection, this ***
*** setting is the cause. The factory*
*** setting for most modems is to ***
*** DSR at all times.                ***
***                                     ***
*****
type "AT&S1",0d,0a
match "OK"
iferror TELCO
*****
*** Write active configuration to ***
*** nonvolatile memory. These settings*
*** will be restored automatically ***
*** whenever the modem is turned on.***
***                                     ***
*****
type "AT&W",0d,0a
match "OK"
iferror TELCO
goto bye
:TELCO
print "TELCO ERROR"
goto exit
:bye_t1
print "Error during modem programming. Type failed."
goto exit
:MODERR
print "Error while setting modulation for 1200 bauds"
goto exit
:FACTORY
print "Error while initializing to factory setting"
goto exit
:bye_m1
print "No answer from modem."
goto exit
:bye_comm
print "**** INIT ERROR !!"
goto exit
:bye
print "Modem programmed successfully"
:exit

```

ECHP: Monitoring Host Print Sessions

Executable	ECHP.EXE	
Purpose	Starts, stops and monitors the status of Host Print sessions.	
Command	ECHP	START
		STOP
		STATUS [/S <i>sessionname</i>]
Parameters	START	Starts Host Print services.
	STOP	Stops Host Print services.
	STATUS	Displays a list of current Host Print sessions and their status.
	/S <i>sessionname</i>	The name of the Host Print session for which you want the status to be displayed.

The ECHP program lets you activate and deactivate Host Print services. It also lists Host Print sessions and Logical Units.

ECNCBLOG: Taking NCB Traces

Executable	ECNCBLOG.EXE	
Purpose	Starts the NCB trace utility.	
Command	ECNCBLOG	-f logfile [-s tracebufsize] [-l ncbdatalen] [-p processes] [-t traceinfo]
Parameters	-f logfile	Specify the name of the logfile.
	-s tracebufsize	Specify the length of trace buffer (default 64k).
	-l ncbdatalen	Specify how much of the NCB data field to log (default 64 bytes).
	-p processes	Specify the number of processes to support (default 4).
	-t traceinfo	Specify what to display in the trace (default 0x00003FF3).
	Possible values for <i>traceinfo</i> .	
	0x00000001	Submitted NCB
	0x00000002	Submitted NCB data
	0x00000004	Completed NCB
	0x00000008	Completed NCB data
	0x00000010	NCB posted to application
	0x00000020	NCB data posted to application
	0x00000040	NCB given to application (through wait)
	0x00000080	NCB data given to application
	0x00000100	Open NCB session
	0x00000200	Close NCB session
	0x00000400	Discover Eiconcard LAN gateway
	0x00000800	Set parameters
	0x00001000	Get parameters
	0x00002000	Application errors

Note: To get information on more than one trace at a time, you must add together the values for *traceinfo*. For example, to receive trace information on *Submitted NCBs* and on *Submitted NCB data*, you would specify a value of 0x00000003.

You must start the trace before you start the application that uses the ECNCB API (e.g. Host Print). As long as it is running, ECNCBLOG will store a trace of the NCBs in the specified logfile. Press CTRL-C to stop the trace.

ECSERVER: LAN Transport

Executable	ECSERVER.EXE	
Purpose	Provides communications services to client workstations on the LAN.	
Command	ECSERVER	[start] stop sessions <session #> status [/Client name]
Parameters	start	Starts Eiconcard LAN Server.
	stop	Stops Eiconcard LAN Server.
	sessions <session #>	Specifies the maximum number of sessions.
	status [/Client name]	Displays status information for the server and all the attached clients. Use the /C option to obtain detailed status information for a specific client.

The ECSERVER program enables you to start, stop and monitor the status of the Eiconcard LAN Server that provides communications services to client workstations on the LAN.

ECSNA: Monitoring SNA Resources

Executable	ECSNA.EXE		
Purpose	Starts, stops, monitors and lists SNA nodes.		
Notes	The gateway PC must be started before you can manipulate SNA resources.		
Command	ECSNA	START	[/Port <i>n</i> <i>portname</i>] /Name <i>node1</i> [... <i>noden</i>]
		STOP	[/Port <i>n</i> <i>portname</i>] /Name <i>node</i> [<i>lu</i>]
		STATUS	[/Eiconcard <i>n</i>] [/Name <i>node</i> [<i>lu</i>]] [/Outfile <i>f</i>]
		LIST	
Parameters	START	Activates the specified node(s).	
	STOP	Deactivates the specified node. Only one node can be stopped at a time.	
	STATUS	This is the same as issuing the command ECMODULE STATUS SNA. Refer to the ECMODULE chapter for more information.	
	LIST	Lists all nodes configured in the registry. For each node, the following information is provided: node name, node type, protocol type, MAXDATA.	
	/Name <i>node</i>	Identifies the node you want to start or stop. Use the node name specified in the Eicon Configuration Program. Up to 32 nodes can be started per Eiconcard.	
	<i>lu</i>	Number of the Logical Unit for which specified action is required.	
	/Eiconcard <i>n</i>	Number of the Eiconcard to obtain status on.	
	/Port <i>p</i> <i>portname</i>	Identifies the Eiconcard port or portname on which nodes will be started or stopped. Port numbers range from 1 to 48. Issue a separate ECSNA START command for each port on which you want to start or stop the node(s).	
	/Outfile <i>f</i>	Specifies the output file name.	

The ECSNA program lets you activate, deactivate, and list SNA nodes and Logical Units. The ECSNA START command establishes a connection between an Eiconcard port and an SNA host. This means that you use ECSNA to start the connection between the various nodes created with the Eicon Configuration Program and the SNA host computer.

Note *In the Eicon Configuration Program, if you set your Virtual Circuit type to Auto, the ECSNA START command does not activate the SDLC or*

X.25/QLLC line to the remote host. Communications with the host will take place only after a user initiates a connection from a workstation. Since the line is not opened until it is required, line costs are reduced.

Using ECSNA

The following examples illustrate how to use ECSNA.

```
ECSNA START /N NODE1
```

Activates the node called NODE1 on port 1.

```
ECSNA STOP /N NODE1 4
```

Deactivates the Logical Unit 4 of NODE1.

```
ECSNA START /P 2 /N ORLANDO
```

Activates the node ORLANDO on port #2.

ECVER: Searching for Eicon Software

ECVER scans the specified drive or folder for any Eicon Networks software, and displays the location and version number of that software.

Executable	ECVER.EXE	
Purpose	Searches your hard disk for any installed Eicon Networks software and indicates the version number of that software.	
Command	ECVER	<i>[path]</i> <i>[/Subdirectory]</i> <i>[/C]</i> <i>[/X]</i>
Parameters	<i>path</i>	The drive and folder you want to scan.
	<i>/C</i>	No classic version. Faster searching.
	<i>/Subdirectory</i>	Scan all subfolders of the folder you specified with <i>path</i> .
	<i>/x</i>	Exclude. Do not show the file if the version is not found.

Using ECVER

The following examples illustrate how to use ECVER.

```
ECVER C:\ /S
```

Scans all of drive C: for Eicon Networks software.

```
ECVER F:\COMM\APPS
```

Searches the F:\COMM\APPS folder for Eicon Networks software.

```
ECVER EC*.EXE
```

Show the version numbers of all Eicon Networks executable files, located in the current folder, whose filenames start with the string "EC".

Chapter Seven

ECMODULE Command

THE ECMODULE COMMAND PROVIDES DETAILED INFORMATION ON the protocols streaming through the gateway PC. This chapter describes what ECMODULE does and explains the fields appearing on the ECMODULE STATS and ECMODULE STATUS display screens. Instructions on using the ECMODULE TRACE utility are also provided.

About ECMODULE

ECMODULE is used to examine the protocol information streaming through the SNA Gateway PC, and to provide statistical information about the various connections.

ECMODULE consists of four main parts:

- **ECMODULE STATUS:** provides global information on the status of all applications running on the gateway PC. Information about connection status for all established links on each Eiconcard is presented.

Application Name	Protocol Name	Connection ID	State		Port

Card number : 1					
APPCLIB	APPC	1	CONNECTED	@10:33:55 Nov 27	1
APPCLIB	APPC	2	CONNECTED	@10:38:33 Nov 27	1
ACCESSW	SDLC	3	CONNECTED	@10:38:35 Nov 27	2
Card number: 2					
ACCESSD	X25	4	CONNECTED	@11:00:34 Nov 27	3

- **ECMODULE STATUS *protocol*:** this derivative of ECMODULE STATUS provides detailed information about the status of the specified protocol that the gateway PC is using. Information about the protocol configuration, status, and connections is presented.

X.25 Loadable Module Status							
Port number: 01			Port name: P1				
	Default	Maximum					
Window size.....	2	7					
Packet size (bytes).....	256	256					
Packet format.....	Extended	Maximum retry count N3.....	3				
Restart timer T20 (sec).....	60	Reset timer T22 (sec).....	60				
Call timer T21 (sec).....	60	Clear timer T23 (sec).....	60				
Idle timer (sec).....	0	Acknowledgement timer (msec):	20				
Two-way VCs configured.....	8	Permanent VCs configured.....	0				
In-coming VCs configured.....	0	Out-going VCs configured.....	0				
Trace.....	Off	Trace buffer size (bytes)....	0				
Trace filter (hex).....	00	Trace entry size (bytes).....	0				
Link activated at.....	@21:07:08	Jan 16					
Last restart.....	@21:07:08	Jan 16					
VC Local Address	Remote Address	Type	Status				

8	5540034622	2Way	Circuit Ready	@05:11:41	Jan 17		

- **ECMODULE STATS *protocol*:** provides statistical information about the protocol. Statistics on data transmission are generated from the traffic streaming through the gateway PC and can help to determine the performance of the transport medium.

X.25 Loadable Module Statistics

Port number: 01

Port name: P1

Sent		Received		Sent		Received	
Call	request.. 1	0	Data packets.....	275	278		
	Confirm.. 0	1	Data segments.....	275	296		
Restart	request.. 1	1	Characters.....	6616	4740		
	Confirm.. 0	0	Receiver Ready....	18	152		
Register	request.. 0	0	Receiver Not Ready:	0	0		
	Confirm.. 0	0	Diagnostic packets:	0	0		
Clear	request.. 0	0	Unknown packets...	0	0		
	Confirm.. 0	0	Rejects.....	0	0		
Reset	request.. 0	0					
	Confirm.. 0	0					
Interrupt	request.. 0	0					
	Confirm.. 0	0					

- **ECMODULE TRACE *protocol*:** lets you capture and examine the low-level communications data streaming through the gateway PC. The trace function can be an essential tool for the data communications expert.

X.25 Loadable Module Trace

Port number: 01

Port name: P1

X.25 Trace

Size = 2048 Length = 256 Block = 18 Mask = FF

[illegible]

ECMODULE: Monitoring the Eiconcard

Executable	ECMODULE.EXE		
Purpose	Use ECMODULE to monitor the traffic on the gateway PC, and to provide a wide range of protocol stats and other information on your connections.		
Commands	ECMODULE	STATUS	[<i>Option</i>] [/Outfile <i>f</i>]
	ECMODULE	STATS	<i>Option</i> [/REset] [/Outfile <i>f</i>] [/?]
	ECMODULE	TRACE	<i>Option</i> [/Filter <i>f</i>] [/REset] [/Block <i>b</i>] [/Size <i>n</i>] [/Truncate <i>n</i>] [/EBcdic] [/Outfile <i>f</i>] [/?]

Where *Option* is any of the following:

X25	[/Port <i>n</i> <i>portname</i>] [/Connection <i>n</i>]
SDLC	[/Port <i>n</i> <i>portname</i>]
HDLC	[/Port <i>n</i> <i>portname</i>]
FRELAY	[/Port <i>n</i> <i>portname</i>] [/Connection <i>n</i>]
SNAFR	[/Port <i>n</i> <i>portname</i>] [/Connection <i>n</i>]
SNA	[/Eiconcard <i>n</i>] [/Name <i>node</i> [lu]]
IDLC	[/Port <i>n</i> <i>portname</i>] [/Connection <i>n</i>]
SNAFM	[/Eiconcard <i>n</i>] [/Connection <i>n</i>]
APPC	[/Eiconcard <i>n</i>] [/Name <i>lluname</i> [<i>rluname</i> [<i>mode</i> [<i>session</i>]]]]

Option for STATUS only:

DIALER	[/Port <i>n</i> <i>portname</i>]
--------	-------------------------------------

Parameters	STATUS	Displays the status of all applications running on the gateway PC. Connections on all active ports on all Eiconcards are shown.
	STATS	Allows display of global or detail statistics about a specified protocol.
	TRACE	Displays the communications data that is streaming through the gateway PC. The trace can filter out unimportant information. Note: Trace is not available for the SNAFM or APPC options.
	<i>Option</i>	Displays the status of the specified protocol and its connections. STATUS provides both general and detailed information.

**Parameters
(continued)**

<code>/Reset</code>	Clears the trace buffer or sets the statistics counters to zero.
<code>/Filter <i>f</i></code>	Allows you to focus the trace and filter out unwanted information. See the Trace Filter section at the end of this chapter for filter definitions.
<code>/Block <i>b</i></code>	The block number in the trace at which the display will begin.
<code>/Size <i>n</i></code>	Size of the trace buffer in bytes. The default is 2048 bytes. If an odd value is specified, the trace size is set to the next lower even value. For example, <code>/S 1025</code> will set the trace size to 1024. Entering a value of 0 stops any active trace. For any other value less than 1024, the trace size value is set to 1024.
<code>/Truncate <i>n</i></code>	The block size of the protocol elements to be traced, where <i>n</i> is the size of the block in bytes. If the data exceeds this size, then the remainder of it is ignored. Note that this size also includes the 3-byte protocol header. If <i>n</i> is less than 16, the truncation size value is set to 16.
<code>/Ebcdic</code>	Displays the information in IBM EBCDIC format.
<code>/Outfile <i>f</i></code>	Replace <i>f</i> with the name of the file to send the output of this command to.
<code>/Port <i>p</i></code> <code> <i>portname</i></code>	Eiconcard port or portname about which to display status.
<code>/Connection <i>n</i></code>	Specifies a circuit, or connection, at the protocol level, where <i>c</i> is the circuit or connection number.
<code>/Name <i>node</i></code>	Specifies a particular node, Logical Unit, Mode or Session. When running ECMODULE STATUS SNA with this parameter, you must also specify the Eiconcard number (<code>/E</code>).
<code>luname</code>	Logical unit name.
<code>/Eiconcard <i>n</i></code>	Eiconcard to monitor, where <i>n</i> is the Eiconcard number, as specified in the Eicon Configuration Program for your Eicon Networks software.
<code>/Listen</code>	This option is for global status only. It allows you to see <i>listen</i> pending. Should not be used with protocol name. For example: ECMODULE STATUS <code>/L</code>

ECMODULE Display Information

ECMODULE displays different status or statistics information depending on the type of protocol you are examining. The rest of this chapter is devoted to describing the ECMODULE display for each protocol type. Sample commands and screens are provided, as well as full parameter descriptions.

Note *ECMODULE TRACE displays are not shown for all protocols. See the end of this chapter for details on this command.*

APPC Status

Command ECMODULE STATUS APPC [/Eiconcard n]
 [/Name lluname [rluname [mode [session]]]]

When you issue the command ECMODULE STATUS APPC on an SNA Gateway with an active APPC connection, status information on that protocol is displayed.

The following command displays general information on APPC connections:

```
ECMODULE STATUS APPC

APPC Loadable Module Status
Card number: 1

Local LUs..... Configured  Used
Remote LUs.....: 32         1
Mode entries.....: 16         2
LU-LU sessions...: 32         5
Conversations....: 32         4
Transaction programs.....: 32         4

Local LU      Session Count
-----
SEND          5
```

There are four levels of detail available with the APPC status commands. The first level of detail shows status of a particular local LU.

```
ECMODULE STATUS APPC /N SEND

APPC Loadable Module Status
Node name.....: PU1
Local LU.....: SEND      Fully qualified name: NETSNA.SEND
Session limit.....: 6      Queue allocate.....: 0
Session used.....: 5      Remote LUs.....: 1
LU started.....: @14:56:42 Feb 26

Remote LU      Session Count
-----
RECV          5
```

You may further obtain detailed status on the Remote LU with this command:

```
ECMODULE STATUS APPC /N SEND RECV

APPC Loadable Module Status
Node name.....: PU1      Local LU.....: SEND
Remote LU.....: RECV     Fully qualified name: NETSNA.RECV
Uninterpreted name.....: RECV   Modes.....: 2
Local LU session limit.....: 6   Remote LU session limit.....: 6
Local LU session used.....: 5   Remote LU session used.....: 5
LU started.....: @14:56:42 Feb 26

Modes      Session Count
-----
SNASVCMG   1
MODENAME   4
```


The third level of detail displays status of a specified Mode:

```
ECMODULE STATUS APPC /N SEND RECV MODENAME

APPC Loadable Module Status

Node name.....: PU1
Local LU.....: SEND
Remote LU.....: RECV
Mode name.....: MODENAME
Local LU session limit.....: 6      Remote LU session limit.....: 6
Local LU session used.....: 5      Remote LU session used.....: 5
Auto activate limit.....: 2      Number of sessions in use...: 4

Terminations.....: 0
Min conversation winners....: 2      Min conversation losers.....: 2
Conversation winners.....: 2      Conversation losers.....: 2

Session  State                Type
-----
2        Active               Conversation winner
3        Active               Conversation winner
4        Active               Conversation loser
5        Active               Conversation loser
```

The last level of detail shows the status of a specified session within a mode:

```
ECMODULE STATUS APPC /N SEND RECV MODENAME 2

APPC Loadable Module Status
Session ID.....: 2
First speaker.....: 1
Node name.....: PU1
Local LU.....: SEND
Remote LU.....: RECV
Mode name.....: MODENAME
Session state.....: Active
```

Global Status Fields

Card number Number of the Eiconcard card being monitored.

Configured Number allocated in the Eicon Configuration Program.

Used Number currently being used.

Local LUs Number of locally configured Logical Units. For each active Local LU, there should be an active Remote LU.

Remote LUs Number of remote Logical Units to which you are connected. For each active Remote LU, there should be an active Local LU.

Mode entries Number of modes used in any of the local or remote transaction programs. When communicating with a host that does not have a peer-to-peer relationship with the local LU, consult the host's VTAM definition for the number of modes required by the remote LUs.

LU-LU sessions Number of sessions between Local and Remote LUs.

Conversations Number of simultaneous APPC conversations.

Transaction programs Number of simultaneous transaction programs.

Local LU Name of each active local Logical Unit.

Session Count Number of active sessions for each listed local LU.

Detail Status Fields

The following fields are displayed at the Local Logical Unit level:

Node name The Eiconcard node being monitored.

Local LU Name of the local Logical Unit being monitored.

Fully qualified name Name by which an LU is known through an interconnected SNA network. This is the fully qualified name of the local LU.

Session limit Maximum number of sessions.

Session used Number of sessions that are being used.

Remote LUs Number of remote Logical Units to which the local LU is connected.

LU started Indicates date and time the local Logical Unit was started.

Remote LU The list of remote local Logical Units to which the local LU is connected.

Session Count The actual number of sessions used by each Remote LU.

The following fields are displayed at the Remote Logical Unit level:

Node name The Eiconcard node being monitored.

Local LU Name of the local Logical Unit to which the remote LU is connected.

Fully qualified name The name by which an LU is known through an interconnected SNA network. This is the fully qualified name of the remote LU.

Remote LU Name of the remote LU being monitored.

Uninterpreted name Any name by which an LU knows another LU for the purpose of initiating an LU-LU session. This is the uninterpreted name of the remote LU.

Node name The Eiconcard node being monitored.

Modes Number of modes used by the remote LU.

Local LU session limit Maximum number of local LU sessions that can be initiated.

Remote LU session limit Maximum number of remote LU sessions that can be initiated.

Local LU session used The actual number of sessions used by the local LU.

Remote LU session used The actual number of sessions used by the remote LU.

LU started The time that the local Logical Unit was started.

Modes The list of modes that have been started on the Remote LU.

Session Count Number of active sessions on each mode.

The following fields are displayed at the Mode level:

Local LU Name of the local Logical Unit being monitored.

Remote LU Name of the remote Logical Units to which the local LU is connected.

Mode name Name of the mode being monitored.

Auto activate limit The maximum number of sessions that can be automatically activated for the mode.

Number of sessions in use Number of active sessions on the mode.

Terminations Number of sessions that have been terminated since the mode was started.

Min conversation winners The minimum number of contention winner sessions within the mode.

Min conversation losers The minimum number of contention loser sessions within the mode.

Conversation winners The actual number of contention winner sessions.

Conversation losers The actual number of contention loser sessions.

Session List of session numbers within the mode.

State Current state of each session.

Type Type of each session established.

The following fields are displayed at the session level:

Session ID Number of the session being monitored.

First speaker This flag is used to indicate whether the session is a first speaker (contention winner) session.

Node name The node being monitored.

Local LU Name of the Local LU on which this session is being monitored.

Remote LU Name of the Remote LU on which this session is being monitored.

Mode name Name of the mode on which this session is being monitored.

Session state Current state of the session.

APPC Statistics

Command `ECMODULE STATS APPC [/Eiconcard n]
 [/Name lluname [rluname [mode]]]`

When you issue the command `ECMODULE STATS APPC` on an SNA Gateway with an active APPC connection, statistical information about the protocol is displayed.

The following command presents global statistics on all APPC connections:

```
ECMODULE STATS APPC

APPC Loadable Module Statistics
Card number: 1

                Local      Remote
Successful sessions started... 1      0
Unsuccessful sessions started: 0      0
Abnormal sessions end..... 0      0
Active sessions..... 1      0
Pending sessions..... 0      0
Terminated sessions..... 0      0
Conversations started..... 1      0
Active conversations..... 1      0
```

Note *Before you attempt to display any of the detailed statistics, run the relevant `ECMODULE STATUS SNA` command in order to obtain a list of all the active nodes, logical units and modes.*

To display detailed statistics on a local LU, use the following command:

```
ECMODULE STATS APPC /N SEND

APPC Loadable Module Statistics
Card number: 1

Node name.....: PU1
Local LU name.....: SEND

                Sent      Received
BTUs.....: 236      119
Characters.....: 62420      1162
```

Further details can be obtained on any remote logical unit connected with the specified node:

```
ECMODULE STATS APPC /N SEND RECV

APPC Loadable Module Statistics
Card number: 1

Node name.....: PU1
Local LU name.....: SEND
Remote LU name.....: RECV

                Sent      Received
BTUs.....: 236      119
Characters.....: 62420      1162
```

Finally, this command can be used to display detailed statistics on the Mode:

```
ECMODULE STATS APPC /N SEND RECV MODENAME
```

```
APPC Loadable Module Statistics
Card number: 1
```

```
Node name.....: PU1
Local LU name.....: SEND
Remote LU name.....: RECV
Mode name.....: MODENAME
```

	Sent	Received
BTUs.....	236	119
Characters.....	62420	1162

Global Statistic Fields

Card number Number of the Eiconcard being monitored.

Local Statistics for the local end (SNA Gateway).

Remote Statistics for the remote end (host).

Successful sessions started Total number of sessions started.

Unsuccessful sessions started Total number of sessions not started successfully.

Abnormal sessions end Number of sessions halted abnormally.

Active sessions Number of currently active connections between the SNA Gateway and the host computer.

Pending sessions Number of sessions initiated by the local end.

Terminated sessions Number of sessions halted by the local end.

Conversations started Number of APPC conversations started.

Active conversations Number of currently active conversations.

Detail Statistics Fields

Card number Number of the Eiconcard being monitored.

Node name Name of the node being monitored.

Local LU name Name of the local logical unit being monitored.

Remote LU name Name of the remote logical unit being monitored.

Mode name Name of the mode being monitored.

BTUs Number of Basic Transmission Units sent/received since the connection was made, or since the last request.

Characters Number of characters sent or received since the connection was made (During Link Lifetime), or since the last request (Since Last Activation).

DIALER Status

Command ECMODULE STATUS DIALER [/Port *p* | *portname*]

When you issue the ECMODULE STATUS DIALER command to the gateway PC, status information about the specified dialer is displayed. This enables you to monitor the Eiconcard Dialer module.

Note *There are no statistics available for the Dialers.*

The following command shows dialer status for all ports on all Eiconcards loaded in the gateway PC:

```
ECMODULE STATUS DIALER
```

Dialer	Executable Status	Port Number	Dialer type	State	Phone Number

Card Number: 1					
01		Direct		Opened	
02		V.25 bis		Dialing	CRN642890

The following is a sample display of information for the AT dialer:

```
ECMODULE STATUS DIALER /P 1
```

```
Dialer Executable Status
Port number: 01                      Port name:

ASYNC Dialer Status

State.....: On Hook
Line speed.....: 2400
Connect time.....: 14:35:48 Nov 10
Main number.....: ATDT1516222233
Alternate number.....:
Answer enable.....: Yes
Retry allowed.....: No                Maximum number of retry.....: 4
Parity.....: Odd                      Bits per byte.....: 7

Clock type.....: External
Data encoding.....: NRZ                Ring Indicator signal.....: Off
Data Set Ready signal...: Off          Data Terminal Ready signal..: Off

Retry delay (msec).....: 5000          Inter-ring min delay (msec)..: 5000
RI DTR delay (msec).....: 1000         Delay off hook (msec).....: 2000
DSR loss delay (msec)....: 1500        DSR on/off delay (msec).....: 2000
Hangup delay (msec).....: 2000         Max delay connect(msec).....: 30000
```


Global Status Fields

Card Number Number of the Eiconcard being monitored.

Port Number Number of the Eiconcard Port being monitored.

Dialer type Type of interface connecting the gateway PC to local or remote host computers.

Value	Description
Direct	Direct dialer.
Asynchronous	AT dialer.
V.25bis	Synchronous dialer
B-channel	ISDN dialer
SIG.+X.25	ISDN dialer

State Current state of the dialer.

Possible states for the Direct Dialer are:

Value	Description
Closed	Dialer not activated.
Opening	Link is being set up.
Answering	Accepting call from remote.
Delaying	Waiting for a timer to expire.
Opened	Physical link is established.
Closing	Disconnecting the physical link.

Possible states for the AT Dialer are:

Value	Description
On hook	Dialer is on hook.
Dialing	Dialing a number.
Answering	Accepting call from remote.
Ringing	Incoming call present.
Retrying	Awaiting new call attempt.
Off hook	The physical link is established. Connection established.
HangingUp	Disconnecting from DCE.

Possible states for the V.25bis Dialer are:

Value	Description
On hook	Not active.
Ready	Ready to program external DCE.
Dialing	Dialing a number.
Connected	Originate call established.
Transmitting Data	Data transfer state enabled.
Retrying	Awaiting call attempt.
Ringing	Incoming call present.
Answer Started	Connect request received. Awaiting DSR.
Answer Completed	Answer call established.
Hanging Up	Dialer disconnecting from DCE.
Ignoring Ring	Ringing signal ignored.
Call Collision	Collision between connection request and incoming call. Priority given to incoming call.
Accepting Answer	Accepted incoming call.
Program Ready	Dialer ready to communicate with external DCE.
Programming	External DCE ready to communicate with dialer; dialer may issue commands.
Program Ring	Ring signal detected from DCE; dialer cannot accept call in program mode.
Program Not Ready	Dialer not ready to communicate with external DCE.

Possible states on the B-channel dialer are:

Value	Description
Deactivated Closed	No HiDriver present, dialer deactivated
Deactivated Open	HiDriver present, dialer deactivated
Wait_act Closed	No HiDriver present, dialer activating
Wait_act Open	HiDriver present, dialer activating
Released Closed	HiDriver present, call control not yet active
Released Opened	Hi Driver not present, call control not yet active.
Closed	No HiDriver, dialer activated but idle.
Opened	HiDriver present, dialer activated but idle.

Connecting	Attempting to initiate an outgoing call or process an incoming call.
Connected	Call connected
Ringing	Incoming call present
Disconnecting	Attempting to disconnect an call.
Closing	process HiDriver CLOSE request.
B Loopback	Dialer is in Loopback mode (special test mode)
Deactivated Linking	Dial request issued in the Deactivated Open state, dialer must first be activated before call is processed.
Activated Linking	Dial request issued in Deactivated Open or Release Open states, must first activate ISDN stack before call can be processed.
Test	Dialer in test mode
Ringing Linking	Not Supported
Invalid	Invalid dialer state

Possible states available on the NI-1 dialer are:

Value	Description
Null	CC deactivated
Idle	Transitory state
Ringing	Incoming call detected, waiting for call to be answered
Connected	Call connected
Dialing	Not Supported
Lockout	Require 'On Hook', before subsequent calls are made
OffHook Releasing	Waiting on DISCONNECT confirmation in OffHook state
OnHook Releasing	Waiting on DISCONNECT confirmation in OnHook state
Originate	Outgoing call attempt in progress
Routing	Waiting on CONNECT/CONNECT_ACK confirmation on Incoming/Outgoing calls prior to moving to CONNECTED state.
Call Queued	Not Supported
Invalid	Invalid CC state

Possible states available on the 5ESS (AT&T) dialer are:

Value	Description
Null	CC deactivated.
Idle	Transitory state.
Ringing	Incoming call detected, waiting for call to be answered.
Connecting	Incoming call answered, awaiting CONNECT confirmation from the switch.
Connected	CONNECT confirmation from the switch received.
Lockout	Require 'On Hook' before subsequent call can be made.
OffHook Releasing	Waiting on DISCONNECT confirmation in OffHook state
OnHook Releasing	Waiting on DISCONNECT confirmation in OnHook state
Originate	Outgoing call attempt in progress
Routing Out	Outgoing call being processed by switch.
Call Queued	Incoming call received when CC already in the RINGING state as a result of a previous call. Queue this second call pending the outcome of the first call (i.e. if first call answered, reject second call, or if first call not answered process second call)
Bell Releasing	Incoming call cleared by the switch.
Invalid	Invalid CC state

Possible states available on the TPH1962 dialer are:

Value	Description
Null	CC deactivated.
Idle	Transitory state.
Ringing	Incoming call detected, waiting for call to be answered.
Connected	Call connected.
Dialing	Not Supported.
Lockout	Require 'On Hook', before subsequent calls are made
OffHook Releasing	Waiting on DISCONNECT confirmation in OffHook state
OnHook Releasing	Waiting on DISCONNECT confirmation in OnHook state
Originate	Outgoing call attempt in progress
Routing	Waiting on CONNECT/CONNECT_ACK confirmation on Incoming/Outgoing calls prior to moving to CONNECTED state.
Call Queued	Not Supported
Invalid	Invalid CC state

Possible states available on the EuroISDN dialer are:

Value	Description
Null	CC deactivated
Idle	Transitory state
Ringing	Incoming call detected, waiting for call to be answered.
Connecting	Incoming call answered, awaiting CONNECT confirmation from the switch.
Connected	CONNECT confirmation from the switch received.
Lockout	Require 'On Hook' before subsequent call can be made.
OffHook Releasing	Waiting on DISCONNECT confirmation in OffHook state
OnHook Releasing	Waiting on DISCONNECT confirmation in OnHook state
Originate	Outgoing call attempt in progress
Routing Out	Outgoing call being processed by switch.
Call Queued	Incoming call received when CC already in the RINGING state as a result of a previous call. Queue this second call pending the outcome of the first call (i.e. if first call answered, reject second call, or if first call not answered process second call)
Bell Releasing	Incoming call cleared by the switch.
Invalid	Invalid CC state.

Phone Number Phone number of the remote modem that you are calling (local originate).

Detail Status Fields

Port number Number of the Eiconcard port being monitored.

Port name Name of the Eiconcard port being monitored.

State Current state of the dialer. See the Global Status fields starting on page 113 for the different states available for each dialer.

Line speed Speed setting of the driver (line speed), or of the dialer (modem speed).

Connect time Time and date the dialer established the current connection.

Main number Main telephone number stored in the dialer.

Alternate number Alternate telephone number stored in the dialer. This number is dialed if the main number is busy or if there is no answer.

Answer enable States whether or not the dialer answers incoming calls.

Value	Description
Yes	Answer incoming calls: auto-answer mode.
No	Ignore incoming calls.

Speaker level Volume level of the Eiconcard's speaker.

Value	Description
High	High volume
Low	Low volume

Retry allowed Indicates whether the dialer will try to redial a number that is busy or does not answer.

Value	Description
Yes	Redials unresponsive number.
No	Does not redial unresponsive number.

Maximum number of retry Specifies how many times to redial a number that is busy or otherwise unresponsive.

Line type States whether the modem is connected to a Leased or Dial-Up phone line.

Value	Description
Leased	The Eiconcard interface is lease type.
Dial-Up	The Eiconcard interface is dial type.

Parity Defines the parity value while in off-line command mode. Parity is a very basic type of error checking. This parameter is used in the asynchronous mode only, and it allows for the specification of call setup commands issued before a connection is established with an external modem. The two ends of an Eiconcard-to-modem connection must use the same parity. Default value: ODD.

Value	Description
ODD	Method of Parity error checking used. Both ends of the connection must be set with the same Parity.
EVEN	
NONE	

Bits per byte Sets the number of bits used to represent a character. The number of bits per character must be set to the same value on both ends of an Eiconcard-to-modem connection. This parameter is used in the asynchronous mode only, and it allows for the specification of call setup commands issued before a connection is established with an external modem. Default value: 7.

Value	Description
7 - 8	Bits per Character; must be the same setting as external modem.

Clock type The type of clocking used by the modem.

Value	Description
Internal	The Eiconcard generates an internal clock for receiving and transmitting, and outputs this clock on the interface for use by the DCE.
External	The Eiconcard uses an external clock supplied by the DCE for receiving and transmitting.
INT+DPLL	The Eiconcard employs a DPLL which uses an internally generated clock which is 32 (NRZI) or 16 (FM) times the data rate.
EXT+DPLL	The Eiconcard employs a DPLL which uses a DCE generated clock which is 32 (NRZI) or 16 (FM) times the data rate.

Carrier signal Indicates whether there is currently a modem carrier signal. When there is no carrier signal, there is no connection.

Value	Description
On	Carrier signal present.
Off	Carrier signal not present.

Data encoding The type of data encoding used on the connection. Both ends must use the same data encoding.

Ring Indicator signal The current status of the RI signal.

Data Set Ready signal The current status of the DSR signal.

Data Terminal Ready signal The current status of the DTR signal.

Call progress The tone management mode. If this value is set to Yes, then the dial tone, busy tone, and ringback tone are detected during call establishment.

Value	Description
Yes	Tone management on.
No	Tone management off.

Tx level attenuation (dB) The attenuation level on data transmission, once the handshake is completed with the remote modem.

Make break ratio The pulse dialing ratio, which is the equivalent of the Hayes &P command.

Rx level attenuation (dB) Minimum acceptable receiver threshold value. This indicates whether a 3dB attenuation is used on the receive signal at line input.

Value	Description
Yes	A 3dB attenuation used on the receive signal.
No	A 3dB attenuation is not used on the receive signal.

DTMF Tx level (dB) The tone dialing level attenuation in dB.

Number of rings Number of rings required before the modem answers, if it is set to auto-answer mode.

Decadic Indicates whether Decadic dialing is active or not. Decadic dialing does the following: each digit you dial is subtracted from 10, and the result is the number actually dialed. For example, if you enter the digit 4, it is subtracted from 10, and the digit 6 is actually dialed. The number 0 remains unchanged when Decadic is on.

Value	Description
Yes	Decadic on.
No	Decadic off.

Retry delay (msec) The amount of time between redial attempts.

Inter-ring min delay (msec) The minimum amount of time allowed between rings. If this minimum is not met, incoming calls are not recognized.

Dial delay (msec) The length of delay associated with a comma placed in an ECDIALER dialing command.

RI DTR delay (msec) Specifies the delay between the ring signal detection and a Data Terminal Ready (DTR) on indication by the Eiconcard. This delay must not exceed the Maximum mDelay Between Rings parameter. Default value: 1000.

Value	Description
0 - 30000	Amount of time between receipt of a ring signal detection and the issuance of a DTR on.

Delay off hook (msec) External modem delay between switching from asynchronous to synchronous mode. Default value: 2000.

Value	Description
0 - 4000	Number of milliseconds delay between the switch from asynchronous to synchronous mode. When this timer is exceeded the modem is placed off-hook.

DSR loss delay (msec) Indicates the number of milliseconds of lost DSR needed to determine that there has been a valid loss of carrier, not just a temporary fluctuation. A valid loss of Data Set Ready (DSR) usually means the modem will hang up. Default value: 1500.

Value	Description
0 - 10000	Number of milliseconds of carrier loss before a valid loss of DSR is indicated.

DSR on/off delay (msec) The maximum delay for Data Set Ready (DSR) to be set to off after Data Terminal Ready (DTR) is set to off. The DTR is set to off on a disconnection request. Default value: 2.

Value	Description
0 - 65	Delay in seconds between a DTR off and a DSR off.

Hang-up delay (msec) Sets the amount of time after the line is hung up before a new command can be issued. This is used to give the modem enough time to revert to the asynchronous mode and get ready to accept other commands. Default value: 2.

Value	Description
0 - 65	Delay in seconds between a hang up request and a hang up.

Maximum delay connect (msec) This parameter is used to determine if an incoming call has been aborted. Default value: 5000.

Value	Description
1 - 9000	Delay in milliseconds between rings. If this timer is exceeded it is assumed that the caller has hung up.

Eicon IDLC Status

Command `ECMODULE STATUS IDLC [/Port p | portname] [/Connection n]`

When you issue the command `ECMODULE STATUS IDLC` from the gateway PC with an active Eicon IDLC connection, status information about your Eicon IDLC connections is displayed.

The following command displays global status of the Eicon IDLC connections on the specified Eiconcard port.

```
ECMODULE STATUS IDLC /P 1

IDLC Loadable Module Status
Port number: 01                      Port name: P1
Reply Timer (T1,msec).....: 1000
Receiver Ack, Timer (T2,msec)...: 200
Inactivity Timer (Ti,msec).....: 0
Number of activated DLCs.....: 0
Max Frame Size.....: 265
Maxout value configured.....: 02
Maxin value configured.....: 02
Max Retry Count.....: 05
Trace.....: Off
-Index---State-----SSAP----DSAP---MAC ADDR--
```

You may also obtain detailed connection status by specifying the connection number, as shown below:

```
ECMODULE STATUS IDLC /P 1 /C 2
```

Port number Number of the Eiconcard Port being monitored.

Port name The name of the Eiconcard Port being monitored.

Reply Timer (T1, msec) Specifies the maximum delay before a required acknowledgement or response is received from the remote host.

Receiver ACK Timer (T2, msec) Specifies the maximum delay before the gateway sends an acknowledgement for a received information frame.

Inactivity Timer (Ti, msec) Specifies the maximum delay before the gateway polls the remote host to make sure that the connection is still operational when idle. This value is normally large, to minimize use of the ISDN line. A value of zero means that the timer is deactivated.

Number of Activated DLCs Specifies the number of Data Link Connections currently in use.

Max. Frame Size The maximum frame size that can be received or printed by this port.

Maxout value configured Specifies the maximum number of information frames that may not be acknowledged by the remote host at a given time.

Maxin value configured Specifies the maximum number of information frames that can be received before sending an acknowledgement.

Max Retry Count Specifies the maximum number of retries that can be attempted upon timer expiration or negative acknowledgement from the remote host.

Trace Indicates whether this protocol is currently being traced with ECMODULE TRACE.

Eicon IDLC Statistics

Command ECMODULE STATS IDLC [/Port *p* | *portname*] [/Connection *n*]

When you issue the command ECMODULE STATS IDLC on the gateway PC with an active Eicon IDLC connection, statistical information is displayed.

The following command displays global statistics of the Eicon IDLC connections on the specified Eiconcard port:

```
ECMODULE STATS IDLC /P 1

IDLC Loadable Module Statistics
Port number: 01                               Port name: P1
SENT                                           RECEIVED
Sabme..... 0                               0
Disc..... 0                               0
Ua..... 0                               0
Dm..... 0                               0
Frmr..... 0                               0
Xid..... 0                               0
Ifr..... 0                               0
Rr..... 0                               0
Rnr..... 0                               0
Rej..... 0                               0
Test..... 0                               0
Tl Expired..... 0
Tx Retry..... 0
Rx Bad Frame..... 0
Tx Error..... 0
```

You may also obtain detailed statistical information about each active Eicon IDLC station by specifying the connection number, as shown below:

```
ECMODULE STATS IDLC /P 1 /C 1
```

Statistics Fields

- Port number** Number of the Eiconcard Port being monitored.
- Port name** The name of the Eiconcard Port being monitored.
- SABME** Number of SABME frames sent/received. This is used to initialize the Eicon IDLC connection.
- Note** *A large number of SABME frames could indicate an unstable Eicon IDLC connection.*

DISC Number of disconnect frames sent/received.

Note *A large number of DISC frames could indicate an unstable Eicon IDLC connection.*

UA Number of Unnumbered Acknowledgment frames sent/received. This is used to respond to a SABME or to a DISC frame when the link is closed at initialization time.

Note *A large number of UA frames could indicate an unstable Eicon IDLC connection.*

DM Number of Disconnected Mode frames sent/received.

FRMR Number of Frame Reject frames sent/received.

XID Number of exchange station identification frames sent/received.

IFR Number of information frames sent/received.

RR Number of Receiver Ready frames sent/received.

RNR Number of Receiver Not Ready frames sent/received.

Rejects Number of Eicon IDLC frames that have been rejected.

Test Number of TEST frames sent/received.

T1 expired Number of times the Reply timer (T1) has been exceeded.

Tx Retry Number of transmission retries.

Rx Bad Frame Number of invalid frames received.

Tx Error Number of transmission errors.

Frame Relay Status

Command ECMODULE STATUS FRELAY [/Port *p* | *portname*] [/Connection *n*]

When you issue the command ECMODULE STATUS FRELAY from the gateway PC with an active Frame Relay connection, status information about your Frame Relay connections is displayed.

The following command displays global status of the Frame Relay connections on the specified Eiconcard port.

```
ECMODULE STATUS FRELAY /P 2

Frame Relay Loadable Module Status
Port number: 02                      Port name: P2
Management Protocol type .....: Annex 'D'
Number of configured FRL .....: 5      Information field size ....: 1514
FRL errors before reported .....: 3      Interval for error report ...: 4
Frequency of STATUS_ENQUIRY (sec) ..: 6      STATUS_ENQUIRY pending .....: 0
STATUS ENQUIRY response time (sec)..: 10     Internal sequence number ....: 104
CIR.....: 64000
Dynamic DLCI.....: OFF
Number of active DLCI .....: 4
Auto LMI.....: ON
Line state .....: Opened                @21:09:53 Jan 16
Trace.....: On                          Trace buffer size (bytes)....: 2048
Trace filter (hex).....: FF              Trace entry size (bytes)....: 64
DLCI      Management Protocol State
-----
101      Active
102      Active
103      Active
104      Active
105      Inactive
Command completed successfully.
```

You may obtain further detailed link station status by entering the following command:

```
ECMODULE STATUS FRELAY /P 2 /C 104

Frame Relay Loadable Module Status
Port number: 02                      Port name: P2
Tx buffer window size (K).....: 2
Trace.....: Off                          Trace buffer size (bytes)....: 0
Trace filter (hex).....: 00              Trace entry size (bytes)....: 0
DLCI      Management Protocol State
-----
104      Active
Command completed successfully.
```

Global Status Fields

Port number Number of the Eiconcard Port being monitored.

Port name The name of the Eiconcard Port being monitored.

Management Protocol type The Local Management Interface protocol used. LMI is a protocol and associated procedures operating on the local interface between the user and the network. LMI provides management of DLCI, which have their endpoints and bearer capabilities defined at subscription time. Pre-ANSILMI is older, and ANSIT1.617 Annex D is newer; networks usually support one or the other.

Number of configured FRL The maximum number of Frame Relay Logical Links (FRLs) allowed on a single port. There can be a maximum of 255 FRLs on an Eiconcard.

Information Field size The Frame Relay Information Field size in octets.

FRL errors before reported Number of reliability Errors and/or Protocol Errors that can occur before a Frame Relay port is declared inactive. This value should always be less than or equal to the Interval for error report.

Interval for error report The measurement interval for the previous parameter.

Frequency of STATUS_ENQUIRY (sec) Indicates how frequently the PC containing your Eicon Networks software initiates a full Status Enquiry message, in increments of 5 seconds. This timer is set to less than the timer used by the Frame Relay Network to verify that the user is sending Status Enquiry messages.

STATUS_ENQUIRY pending Number of STATUS_ENQUIRY messages that have been sent without any response from the Frame Relay Network.

STATUS_ENQUIRY response time (sec) Indicates how frequently the PC containing your Eicon Networks software initiates a STATUS_ENQUIRY message, in increments of 5 seconds. This timer is set to less than the timer used by the Frame Relay Network to verify that the user is sending Status Enquiry messages.

Internal sequence number The sequence number in the last STATUS_ENQUIRY message sent.

CIR Committed Information Rate. The rate, in bits per second, at which the network transfers information under normal conditions. Network Service Providers typically set pricing based on the CIR (plus other criteria) and guarantee it. The valid range is 0 to 45,000,000. The default value is 64,000.

Dynamic DLCI Indicates whether DLCIs must be statically configured (OFF) or whether they are allocated during a full status report (ON).

Auto LMI Indicates whether the gateway automatically detects which LMI protocol is in use(ON) or not (OFF).

Number of active DLCI Number of active DLCIs currently in use.

Line state The Frame Relay Protocol state.

Value	Description
Closed	Frame Relay port is deactivated.
Closing	Request to deactivate Frame Relay port.
Opening	Request to activate Frame Relay port.
Opened	Frame Relay port is activated.
Disconnect	Loss of Frame Relay link.
Reconnect	Attempting to re-establish Frame Relay link.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For a more detailed description, see the “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to only examine the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, only the first 32 bytes of each frame or packet is loaded into the trace buffer.

DLCI The Data Link Connection ID. Identifies a particular logical link in the Frame Relay network.

Management Protocol State The DLCI state.

Value	Description
Active	The Management Protocol State is active.
Inactive	The Management Protocol State is not active.

Detail Status Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

Tx buffer window size (K) The size of the Frame Relay window for each DLCI. This window is used for transmission buffer control.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For a more detailed description, see “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, then only the first 32 bytes of each frame or packet is loaded into the trace buffer.

DLCI The Data Link Connection ID. Identifies a particular logical link in the Frame Relay network.

Management Protocol State The DLCI state.

Value	Description
Active	The Management Protocol State is active.
Inactive	The Management Protocol State is not active.

Frame Relay Statistics

Command `ECMODULE STATS FRELAY [/Port p | portname] [/Connection n]`

When you issue the command `ECMODULE STATS FRELAY` from the gateway PC with an active Frame Relay connection, global statistical information about the protocol is displayed.

The following command displays global statistics of the Frame Relay connections on the specified Eiconcard port.

```
ECMODULE STATS FRELAY /P 2

Frame Relay Loadable Module Statistics
Port number: 02                      Port name: P2
Link up.....: 1                    Link down.....: 0
Link errors.....: 0                  Expired T1 timer.....: 28698
Parse error.....: 0
Status Enquiry Message
Full status sent.....: 4783
Sequence # exchange only...: 23915
Unexpected Status Enquiry Response Message
Full status received.....: 0
Sequence # exchange only...: 0
Sent      Received
Frames.....: 18520          18521
bytes.....: 185585          185608
Sequence #0.....: 1          0
Command Completed Successfully.
```

You may also obtain detailed statistical information on a particular DLCI station by issuing the following command:

```
ECMODULE STATS FRELAY /P 2 /C 104

Frame Relay Loadable Module Statistics
Port number: 02                      Port name: P2
Port number.....: 0
DLCI.....: 104
DLCI up.....: 1                    DLCI down.....: 0
Backward congestion.....: 0        Forward congestion.....: 0
Sent      Received
Frames.....: 0                    0
bytes.....: 0                    0
Command Completed Successfully.
```

Global Statistics Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

Link up Number of times the link went up.

Link down Number of times the link went down.

Link errors Number of times the modem signal was lost on the link.

Expired T1 timer The interval of time at which the Eiconcard initiates a Status Enquiry message.

Parse error Number of communications errors that were received.

Full Status sent Number of times a Full Status Report was sent.

Sequence # exchange only Number of Status message exchanges sent.

Full status received Number of times a Full Status Report was received.

Sequence # exchange only Number of Status message exchanges received.

Frames Number of frames sent or received.

bytes Number of bytes sent or received.

Sequence #0 The Status Enquiry message received or sent with a Receive Sequence = 0.

Detail Statistics Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

DLCI The Data Link Connection ID.

DLCI up Number of times the DLCI goes from active to inactive.

DLCI down Number of times the DLCI goes from inactive to active.

Backward congestion Number of frames received with backward congestion.

Forward congestion Number of frames received with forward congestion.

Frames Number of frames sent or received on this port connection.

bytes Number of bytes sent or received on this port connection.

HDLC Status

Command ECMODULE STATUS HDLC [/Port *p* | *portname*]

When you issue the command ECMODULE STATUS HDLC from the gateway PC with an active HDLC connection, status information about the HDLC connection is displayed.

The following command displays status of the HDLC connections on the specified Eiconcard port:

```
ECMODULE STATUS HDLC /P 1

HDLC Loadable Module Status
Port number: 01
Addressing.....: DTE
Link setup.....: Active
Maximum retry count N2.....: 10
Maximum window size K.....: 7
Protocol state.....: Opened
Line state.....: Opened
Trace.....: Off
Trace filter (hex).....: 00
Command completed successfully.

Port name: P1
Check point timer T1 (msec)..: 2900
Ack delay timer T2 (msec)...: 200
Idle probe timer T3 (msec)...: 15000
Maximum frame size N1 (byte): 261
@21:07:08 Jan 16
@21:07:08 Jan 16
Trace buffer size (bytes)....: 0
Trace entry size (bytes)....: 0
```

The following status is displayed when a TRANSPAC X.32 selection is made in the Eicon Configuration Program:

```
ECMODULE STATUS HDLC /P 1

HDLC Loadable Module Status
Port number: 1
Addressing.....: DTE
Link setup.....: Active
Maximum retry count N2.....: 10
Maximum window size K.....: 7
Protocol state.....: Opened
Line state.....: Opened
TRANSPAC X.32 CID.....: 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
TRANSPAC X.32 SID.....: 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
Trace.....: Off
Trace filter (hex).....: 00

Port name: MONTREAL01A
Check point timer T1 (msec)..: 2900
Ack delay timer T2 (msec)...: 200
Idle probe timer T3 (msec)...: 15000
Maximum frame size N1(bytes): 272
@16:37:01 Nov 27
@16:37:01 Nov 27
Trace buffer size (bytes)....: 0
Trace entry size (bytes)....: 0
```

Note Status displays for ERIPAK and CCITT X.32 selections are slightly different from those shown above.

Status Fields

Port number Number of the Eiconcard Port being monitored.

Port name The name of the Eiconcard Port being monitored.

Addressing Indicates whether the monitored Eiconcard port is configured as a DTE (data terminal equipment) or a DCE (data circuit-terminating equipment).

Value	Description
DTE	Used when the Eiconcard port is connected to an X.25 network, or to another computer configured as DCE (null-modem connection).
DCE	Used when the Eiconcard port is connected to another computer which is configured as DTE.

Check point timer T1 (msec) When this timer expires, an attempt is made to determine the status of the remote device.

Link setup Controls how the HDLC Link setup procedure is handled. Note that if both ends are PASSIVE, the link cannot be made.

Value	Description
Active	The Eiconcard port initiates the setup procedure.
Passive	The Eiconcard port waits for the other side to initiate the setup procedure.

Ack delay timer T2 (msec) To optimize communications efficiency, acknowledgments can be piggy-backed onto outgoing frames rather than being sent out on their own. This field defines the length of the wait for an outgoing information frame.

Maximum retry count N2 Specifies the limit to the number of retries made when a particular frame meets with repeated negative acknowledgments from the remote device.

Idle probe timer T3 (msec) When this timer expires, an RR (receiver ready) frame (has a command P-bit set) is sent to determine the status of the remote device. If the remote device is still functioning it will respond with an RR frame (has a command F-bit set) as well.

Maximum window size (K) Number of frames that can be sent before waiting for an acknowledgment. Maximum window size can never be exceeded.

Maximum frame size N1(bytes) Indicates the maximum size of the HDLC frame.

Protocol state The current status of the HDLC protocol.

Value	Description
Closed	Protocol not activated.
Closing	Terminating HDLC protocol.
Opening	Activating HDLC protocol.
Opened	HDLC active (Data mode).
Resetting	HDLC line is resetting (Sent or received a SABM).
Wait Reset	Waiting for a remote to reset the HDLC line.
Wait Open	When passive or DCE, wait for remote to activate the line using SABM.
XID Send	An X.32 XID has been sent.
XID Recv	Wait for an X.32 XID from remote.

Line state The current status of the line itself.

Value	Description
Closed	Line is closed.
Closing	Line is closing.
Opening	Opening the line.
Opened	Line is ready.
Delaying	Waiting for a small delay in order to re-open the line.

TRANSPAC X.32 CID and TRANSPAC X.32 SID *These fields are displayed only when an X.32 selection is made in the Eicon Configuration Program.* The TRANSPAC X.32 CID is a code that identifies you to other systems. This is useful when you are using a dial-up line and the temporary DTE address is insufficient to properly identify you.

ERIPAK *This field is displayed only when an ERIPAK selection is made in the Eicon Configuration Program.* The ERIPAK CID is a code that identifies you to other systems. This is useful when you are using a dial-up line and the temporary DTE address is insufficient to properly identify you.

CCITT X.32 *This field is displayed only when a CCITT X.32 selection is made in the Eicon Configuration Program.* The CCITT X.32 is a code that identifies you to other systems. This is useful when you are using a dial-up line and the temporary DTE address is insufficient to properly identify you.

Trace (On/Off) Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For more information, see “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, only the first 32 bytes of each frame or packet is loaded into the trace buffer.

HDLC Statistics

Command `ECMODULE STATS HDLC [/Port p | portname]`

When you issue the command `ECMODULE STATS HDLC` on the gateway PC with an active HDLC connection, statistical information is displayed.

The following command displays statistics of the HDLC connections on the specified Eiconcard port:

```
ECMODULE STATS HDLC /P 1

HDLC Loadable Module Statistics
Port number: 01                      Port name: P1
T1 expired.....: 0                  Retransmissions...: 0
Underrun.....: 0
Overrun.....: 0

      Sent      Received      Sent      Received
SABM.....: 1      0      XID.....: 0      0
DISC.....: 0      0      I.....: 295    432
UA.....: 0      1      RR.....: 19449  19446
DM.....: 0      0      RNR.....: 0      0
FRMR.....: 0      0      Rejects.....: 0      0
Abort.....: 0      0
Bad type.....: 0
Bad CRC.....: 0
Command Completed Successfully.
```

Statistics Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

T1 expired Number of times the Checkpoint timer (T1) has been exceeded.

Retransmissions Number of times a frame was retransmitted.

Underrun Number of times that more frames have been transmitted than the receiver can handle.

Overrun Number of times that the Eiconcard could not handle incoming frames.

SABM Number of Set Asynchronous Balanced Mode frames sent/received. This is used to initialize the HDLC connection.

Note *A large number of SABM frames could indicate an unstable HDLC connection.*

XID Number of exchange station identification frames sent/received.

DISC Number of disconnect frames sent/received.

Note *A large number of DISC frames could indicate an unstable HDLC connection.*

I Number of information frames sent/received.

UA Number of Unnumbered Acknowledgment frames sent/received. This is used to respond to a SABM or to a DISC frame when the link is closed at initialization time.

Note *A large number of UA frames could indicate an unstable HDLC connection.*

RR Number of Receiver Ready frames sent/received.

DM Number of Disconnected Mode frames sent/received.

RNR Number of Receiver Not Ready frames sent/received.

FRMR Number of Frame Reject frames sent/received.

Rejects Number of HDLC frames that have been rejected.

Abort Number of frames received with abort indication.

Bad type Number of unknown frames received.

Bad CRC Number of frames received with bad CRC.

SDLC Status

Command ECMODULE STATUS SDLC [/Port *p* | *portname*] [/Connection *n*]

When you issue the command ECMODULE STATUS SDLC from the PC running your Eicon Networks software and with an active SDLC connection, status information on that protocol is displayed.

The following command displays the global status of the SDLC connections on the specified Eiconcard port:

```
ECMODULE STATUS SDLC /P 2

SDLC Loadable Module Status
Port number: 02                               Port name:

Line type.....: Leased   Duplex.....: Full
Maximum window size.....: 7   Maximum frame size(octets)....: 1996
Maximum multi-drop stations: 9   Multi-drop stations in use....: 5
Trace.....: On             Trace buffer size (bytes)....: 2048
Trace filter (hex).....: FF   Trace entry size (bytes).....: 256

Addr  Type      Protocol State
-----
1      Secondary Opened           08:41:34 Nov 30
2      Secondary Opened           08:41:36 Nov 30
3      Secondary Opened           08:41:38 Nov 30
4      Secondary Opened           08:44:40 Nov 30
5      Secondary Opened           08:41:42 Nov 30
```

You may also obtain detailed connection status by specifying the connection as shown below:

```
ECMODULE STATUS SDLC /P 2 /C 1

SDLC Loadable Module Status
Port number: 02                               Port name:

Maximum frame size (octets): 265
Maxin (bytes).....: 7           Maxout (bytes).....: 7
Trace.....: Off             Trace buffer size (bytes)....: 0
Trace filter (hex).....: 00   Trace entry size (bytes).....: 0

Addr  Type      Protocol State
-----
1      Secondary Opened           08:41:34 Nov 30
```

Global and Detailed Status Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

Line type Indicates whether the modem is connected to a Leased or Dial-Up line.

Value	Description
Leased	The Eiconcard is connected to a null-modem cable or a modem that links to a dedicated leased line.
Dial-Up	The Eiconcard must dial a number to make a connection.

Duplex The type of device to which the port is connected. Full-duplex devices enable the port to transmit and receive data at the same time. With a half-duplex device, the port must alternate between transmitting and receiving.

Value	Description
Full	Full-duplex
Half	Half-duplex

Maximum window size Number of frames that can be received before an acknowledgment is sent. It is sometimes desirable to have a large window size. This is particularly true for satellite networks that have significant transmission delays.

Maximum frame size (octets) Maximum SDLC frame size.

Maximum multi-drop stations Number of multi-drop stations (controllers and/or nodes) defined for the same line.

Multi-drop stations in use Number of multi-drop stations currently being used.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) Indicates the trace filter that is currently being used. See “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first bytes of each frame or packet traced. If you have a Trace Entry Size of 512 bytes, only the first 512 bytes of each frame or packet is loaded into the trace buffer.

Addr The control unit (CU) hexadecimal address (up to FF) of the SDLC link connection.

Type The kind of station role the PC running your Eicon Networks software is performing.

Value	Description
Primary	The PC running your Eicon Networks software is the primary (master) multi-drop station.
Secondary	The PC running your Eicon Networks software is a secondary (slave) multi-drop station.

Protocol State The current status of the SDLC protocol.

Value	Description
Closed	Protocol not activated.
Closing	Terminating SDLC protocol.
Opening	Activating SDLC protocol.
Opened	SDLC active (Data mode).
Resetting	SDLC line is resetting (Sent or received a SNRM).
Wait Reset	Waiting for a remote to reset the SDLC line.
Wait Open	When passive or DCE, wait for remote to activate the line using SNRM.

Statistics Fields

Port number Number of the Eiconcard Port being monitored.

Port name The name of the Eiconcard Port being monitored.

Station address The hexadecimal control unit address (up to FF) of the station being monitored.

T1 expired Number of times the Checkpoint timer (T1) protocol timer has been exceeded.

Retransmissions Number of retransmitted frames.

Underrun Number of times an underrun occurred. An underrun occurs when more frames have been transmitted than the receiver can handle.

Overrun Number of times an overrun occurred. An overrun occurs when the Eiconcard port driver cannot handle incoming frames.

DM Number of disconnected mode U-frames sent/received.

FRMR Number of frame reject U-frames sent/received.

UA Number of unnumbered acknowledgment U-frames sent/received.

SNRM Number of set normal response mode U-frames sent/received.

XID Number of exchange station identification U-frames sent/received.

TEST Number of TEST U-frames sent/received.

I Number of information frames sent/received.

DISC Number of disconnect U-frames sent/received.

RR Number of receiver ready I-frames sent/received.

REJ Number of reject I-frames sent/received.

RNR Number of receiver not ready I-frames sent/received.

Bad type Number of unknown frames received.

Bad CRC Number of frames received with bad CRC.

SNA Status

Command ECMODULE STATUS SNA [/Eiconcard n] [/Name node [luname]]

When you issue the command ECMODULE STATUS SNA with an active SNA connection, status information about that protocol is displayed.

The following command displays the global status of the SNA connections on the specified Eiconcard:

```
ECMODULE STATUS SNA

SNA Loadable Module Status
Connection Retry Limit.....: 5           Connection retry timer (sec): 20
Idle switch disconnect (sec): 60          XID negotiation timer (sec):: 3
Logical link setup (sec).....: 60         LU idle disconnect (sec).....: 0
                                         Configured  Used
Nodes.....: 9                            1
Dependent LUs.....: 32                    0
Independent LU Sessions.....: 32           0
Buffers.....: 64                          0
MAXDATA.....: 521
Node      Node      Port Prot  Dep.LUs  Indep.LUs  Node
Name      Type      No.  Type   Used Free  Sess. Used  State
-----
FR101     APPC       2    FRELAY 0      0      0      Active  @21:10:21 Jan 16
Command completed successfully.
```

The following example displays detailed status on a specified node:

```
ECMODULE STATUS SNA /N FR101

SNA Loadable Module Status
Dependent LUs Configured.....: 0           MAXDATA.....: 521
Local: SAP ID .....: 04
      DLCI address.....: 101
Remote: Node type.....: APPC
      SSCP ID(hex).....: 000000000000
      CP name.....: APPN.S100256D
      SAP ID.....: 04
Trace.....: Off           Trace buffer size (bytes).....: 0
Trace filter (hex).....: 00      Trace entry size (bytes).....: 0
Node      Node      Port Prot  Dep.LUs  Indep.LUs  Node      Node
Name      Type      No.  Type   Used Free  Sess. Used  State      Started
-----
FR101     APPC       2    FRELAY 0      0      0      Active  @21:10:21 Jan 16
Command completed successfully.
```


This level of detail can be increased to display the status of a specific LU connection:

```
ECMODULE STATUS SNA /N X2503 2

SNA Loadable Module Status
Node Name.....: X2503

Trace.....: Off          Trace buffer size (bytes)....: 0
Trace filter (hex).....: 00      Trace entry size (bytes)....: 0

LU   Type      Host Appl. ID   Application   Status
-----
2    DISPLAY   Unknown          ACCESSO      Active      @23:20:06 Feb 28
```

Global Status Fields

Connection retry limit Number of times to attempt to re-establish a connection. If a value of 99 is indicated, the number of times is unlimited.

Connection retry timer (sec) The delay between connection attempts.

Idle switch disconnect (sec) Allow disconnection of a switched line when LUs are in inactive state for this amount of time.

XID negotiation timer (sec) This timer is started when a connection is established. It is reset when an XID frame is received. On expiration, an XID frame is sent and the timer is restarted.

Logical link setup (sec) This timer is started when a virtual circuit is established. It is reset when an SNRM frame is received. On expiration, the call is considered to be unsuccessful and a retry is made.

LU idle disconnect (sec) This timer is started when an LU host application session is established. If there is no activity after the specified amount of time, then the LU session will be disconnected.

Nodes Number of nodes currently in use.

Dependent LUs Number of connections that an application is making.

Independent LU Sessions Number of connections that an APPC application is making with LU6.2.

Buffers Number of buffers allocated to the SNA Path Control Module.

MAXDATA Maximum frame size. Determined by the host configuration.

Node Name The name of the node being monitored.

Node Type The type of node with which the gateway is communicating.

Value	Description
5250	PU Type 1.
3270	PU Type 2.
APPC	PU Type 2.1. Runs advanced program-to-program communications.
3270/APPC	Supports the functions of PU Type 2.1 and PU Type 2.

Port No. The Port Number currently being monitored on the Eiconcard.

Prot. Type The type of protocol being used on the specified connection.

Dep. LUs Used Number of dependent Logical Units being used.

Dep. LUs Free Number of Logical Units available for use.

Indep. LUs Sess. Used Number of independent Logical Units used.

Node State The current status of the node.

Value	Description
Active	The node is connected.
Inactive	The node is not connected.

Detail Status Fields

The following fields are displayed at the node level:

Dependent LUs Configured Number of LUs configured for this node.

MAXDATA The maximum frame size configured.

Local SAP ID The Service Access Point address of the local device.

Local DLCI address The Data Link Control Identifier. Identifies a particular logical link.

Remote Node Type The type of remote node with which the gateway is communicating.

Remote SSCP ID The Systems Server Control Point ID for the remote node.

Remote CP name The Control Point name for the remote node.

Remote SAP ID The Service Access Point address of the remote device.

Trace Indicates whether this protocol is being traced with ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For more information, refer to “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 512 bytes, only the first 512 bytes of each frame or packet is loaded into the buffer.

Node Name The name of the node with which the gateway is communicating.

Node Type The type of node with which the gateway is communicating.

Value	Description
5250	PU Type 1.
3270	PU Type 2.
APPC	PU Type 2.1. Runs advanced program-to-program communications.
3270/APPC	Supports the functions of PU Type 2.1 and PU Type 2.

Port No. The Port Number currently being monitored on the Eiconcard.

Prot. Type The type of protocol being used on the specified connection.

Dep. LUs Used Number of dependent Logical Units being used.

Dep. LUs Free Number of Logical Units available for use.

Indep. LU Sessions Used Number of independent Logical Units used.

Node State The current status of the node.

Node Started Specifies the date and time that the node was started.

LU Number of the Logical Unit being monitored.

Type The type of LU being monitored.

LU Type	Description
Display	Terminal device.
Printer	Printer device.
Others	LU 0 or LU6.2 device.

Host Appl. ID The ID of the host application being used.

Application The name of the application using the LU.

Status The state of the LU session. It can either be active or inactive.

The following fields are displayed at the Logical Unit level:

Node Name The gateway node name.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For more information, refer to “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to only examine the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 512 bytes, then only the first 512 bytes of each frame or packet is loaded into the trace buffer.

LU Number of the Logical Unit being monitored.

Type The type of LU being monitored.

Host Appl. ID The ID of the host application being used.

Application The name of the application using the LU.

Status The state of the LU session. It can either be active or inactive.

SNA Statistics

Command `ECMODULE STATS SNA [/Port n | portname] [/Name node [luname]]`

When you issue this command on an SNA gateway PC with an active SNA Path Control connection, statistical information about the protocol is displayed.

The following command displays the global statistics of the SNA connections on the specified Eiconcard port:

```
ECMODULE STATS SNA

SNA Loadable Module Statistics
Connections established: 1
Connections rejected...: 0
                        Sent      Received
BTUs.....: 273      276
Characters.....: 6606    4736
Command Completed Successfully.
```

You may also obtain detailed statistics on a node with the command:

```
ECMODULE STATS SNA /N PXCTEST

SNA Loadable Module Statistics
Node name.....: PXCTEST
Connections established: 1
Connections rejected...: 0
During Node Lifetime
                        Sent      Received
BTUs.....: 273      276
Characters.....: 6606    4736
Since Last Activation
                        Sent      Received
BTUs.....: 273      276
Characters.....: 6606    4736
Command Completed Successfully.
```

Global and Detail Statistics Fields

Node Name The name of the node with which the gateway is communicating.

Connections established Number of simultaneous connections.

Connections rejected Number of rejected connections.

BTUs Number of Basic Transmission Units sent or received since the connection was made (During Link Lifetime), or since the last request (Since Last Activation). These counters are reset with the `/Reset` option.

Characters Number of characters sent by the Eiconcard, or received from the host, since the connection was made or since the last request. These counters are reset with the `/Reset` option.

SNA Function Management Status

Command `ECMODULE STATUS SNAFM [/Eiconcard n] [/Connection n]`

When you issue the command `ECMODULE STATUS SNAFM` on an SNA gateway PC with an active SNA Function Management connection, status information on that protocol is displayed. This information is valid only for LUs created using the Function Management toolkit.

The following command displays the global status of the SNA Function Management connections on the specified Eiconcard.

```
ECMODULE STATUS SNAFM /E 2

SNA FM Loadable Module Status
Card number: 2
```

	Configured	Used
LU-LU sessions.....	64	1
SNAFM application sessions...	32	0
Buffers.....	32	0
Maximum RU.....	256	
Maximum pacing.....	7	

Connection ID	Node Name LU number	Local LU Name Local LU Type	Remote LU Name Mode Name	Status
1	NODE1 10	LOCALLU 6.2 (APPC)	REMO TELU XCOMM MODE	Active

You may also obtain detailed connection status by issuing this command:

```
ECMODULE STATUS SNAFM /E 2 /C 1

SNA FM Loadable Module Status
```

Connection ID	Node Name LU number	Local LU Name Local LU Type	Remote LU Name Mode Name	Status
1	10	LOCALLU 6.2 (APPC)	REMO TELU XCOMM MODE	Active

Global and Detail Status Fields

Card number Number of the Eiconcard card being monitored.

LU-LU sessions The total number of LU-LU sessions.

SNAFM application sessions Number of SNA Function Management sessions.

Buffers Number of buffers allocated to the SNA Function Management module.

Maximum RU The RU (Request Unit) is the basic data unit that SNA Function Management deals with. The Maximum RU Size must be large enough to accommodate the RU size of any remote LU.

Maximum pacing Number of RUs sent before the sender must ask the receiver if it may send more. This prevents the sender from filling up SNA Function Management buffers with RUs before the receiver has had a chance to process them.

Connection ID The logical session number of the call. This is a unique number assigned by the protocol software to each connection.

Node Name The name of the node the LUs for this session belong to.

LU Number Number associated with a Logical Unit on the specified node.

Local LU Name The name associated with a Logical Unit on the specified node. This name only exists for LUs created by the Eicon Networks APPC module.

Local LU Type The type of Logical Unit being monitored.

Value	Description
0	An implementation-defined LU type that is used to support program-to-program communications.
1	Supports communications between a remote terminal and a host-based application.
2	Supports communications with display stations using the 3270 data stream format.
3	Supports communications with printers using the 3270 data stream format.
4	Supports communications with printers using the 5250 data stream format.
6.2	Supports generalized advanced program-to-program communications.
7	Supports communications with display stations using the 5250 data stream format.

Remote LU Name The name associated with a partner LU on the specified node. This name only exists for LUs created by the APPC module.

Mode Name The Mode Name is associated with a class of network properties used by the LU-LU session. This name only exists for LUs created by the APPC module.

Status The current status of the specified connection.

State	Description
Inactive	The session is inactive and cannot be used
Pending Activation	The session is being activated.
Pending init RSP	The session is waiting for the INIT-SELF response.
Pending init	The session is going to send the INIT-SELF.
Pending bind	The session is waiting for the BIND.
Pending bind RSP	The session is waiting for the BIND response.
Active	The session is active and can be used.
Pending unbind RSP	The session is waiting for the UNBIND response.

SNA Function Management Statistics

Command `ECMODULE STATS SNAFM [/Eiconcard n] [/Connection n]`

When you issue the command `ECMODULE STATS SNAFM` on an SNA gateway PC with an active SNA Function Management connection, statistical information about the protocol is displayed.

The following command displays the global statistics of the SNA Function Management connections on the specified Eiconcard.

```
ECMODULE STATS SNAFM /E 2

SNA FM Loadable Module Statistics
Card number: 2
```

	Sent	Received
Bind requests.....	0	1
Positive bind responses..	1	0
Negative bind responses..	0	0
Unbind requests.....	0	0
Positive unbind responses:	0	0
Negative unbind responses:	0	0
RUs.....	235	0
Characters.....	60160	0

You may also obtain detailed statistical information by issuing the following command:

```
ECMODULE STATUS SNAFM /E 1

SNA FM Loadable Module Statistics
Card number: 1
```

Session id.....		Sent	Received
2	RUs.....	0	0
	Characters.....	0	0

Global Status Fields

Card number Number of the Eiconcard being monitored.

Bind request Number of BIND requests the gateway PC or remote has received for LUs created with the SNAFM toolkit.

Positive bind responses Number of received BIND requests to which the gateway PC or the remote has responded positively.

Negative bind responses Number of received BIND requests to which the gateway PC or the remote has responded negatively.

Unbind requests Number of UNBIND requests the gateway PC has received or sent.

Positive unbind responses Number of received UNBIND requests to which the gateway PC or the remote has responded positively.

Negative unbind responses Number of received UNBIND requests to which the gateway PC or the remote has responded negatively.

RUs Number of Request Units sent by the Eiconcard or received from the host computer.

Characters Number of characters sent by the Eiconcard or received from the host.

Detail Statistics Fields

Card number Number of the Eiconcard being monitored.

ID Number of the Eiconcard session being monitored.

RUs Number of Request Units sent by the Eiconcard or received from the host computer.

Characters Number of characters sent by the Eiconcard or received from the host.

SNA over Frame Relay Status

Command `ECMODULE STATUS SNAFR [/Port p | portname] [/Connection n]`

When you issue the command `ECMODULE STATUS SNAFR` from the gateway PC with an active SNA over Frame Relay connection, status information about your connection is displayed.

The following command displays global status of the SNA over Frame Relay connections on the specified Eiconcard port.

```
ECMODULE STATUS SNAFR /P 1

Frame Relay Loadable Module Status
Port number: 01                      Port name: FRELAY01

Management Protocol type .....: Annex 'D'
Number of configured FRL .....: 2    Information Field size .....: 1515

FRL errors before reported .....: 3    Interval for error report ...: 4
Frequency of STATUS_ENQUIRY (sec) ..: 6    STATUS_ENQUIRY pending .....: 0
STATUS_ENQUIRY response time (sec): 10    Internal sequence number ....: 5

Number of active DLCI .....: 2
Line state .....: Opened                      @04:23:56 Nov 20

Trace.....: Off                      Trace buffer size (bytes)....: 0
Trace filter (hex).....: 00          Trace entry size (bytes)....: 0

DLCI          Management Protocol State
-----
16             Active
17             Active
```

You may obtain detailed link station status by entering the following command:

```
ECMODULE STATUS SNAFR /P 1 /C 16

Frame Relay Loadable Module Status
Port number: 01                      Port name: FRELAY01
Tx buffer window size (K).....: 2

Trace.....: Off                      Trace buffer size (bytes)....: 0
Trace filter (hex).....: 00          Trace entry size (bytes)....: 0

DLCI          Management Protocol State
-----
16             Active
```

Global Status Fields

Port number Number of the Eiconcard Port being monitored.

Port name The name of the Eiconcard Port being monitored.

Management Protocol type The Local Management Interface protocol used. LMI is a protocol and associated procedures operating on the local interface between the user and the network. LMI provides management of DLCI, which have their endpoints and bearer capabilities defined at subscription time. Pre-ANSILMI is older, and ANSIT1.617 Annex D is newer; networks usually support one or the other.

Number of configured FRL The maximum number of Frame Relay Logical Links (FRLs) allowed on a single port. There can be a maximum of 255 FRLs on an Eiconcard.

Information Field size The Frame Relay Information Field size in octets.

FRL errors before reported Number of reliability Errors and/or Protocol Errors that can occur before a Frame Relay port is declared inactive.

Frequency of STATUS_ENQUIRY (sec) Indicates how frequently the PC running your Eicon Networks software initiates a Status Enquiry message, in increments of 5 seconds. This timer is set to less than the timer used by the Frame Relay Network to verify that the user is sending Status Enquiry messages.

STATUS_ENQUIRY pending Number of STATUS_ENQUIRY messages that have been sent without any response from the Frame Relay Network.

STATUS_ENQUIRY response time (sec) Indicates how frequently the PC running your Eicon Networks software initiates a STATUS_ENQUIRY message.

Internal sequence number The sequence number in the last STATUS_ENQUIRY message sent.

Number of active DLCI Number of active DLCIs currently in use.

Line state The Frame Relay Protocol state.

Value	Description
Closed	Frame Relay port is deactivated.
Closing	Request to deactivate Frame Relay port.
Opening	Request to activate Frame Relay port.
Opened	Frame Relay port is activated.
Disconnect	Loss of Frame Relay link.
Reconnect	Attempting to re-establish Frame Relay link.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For a more detailed description, see “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, only the first 32 bytes of each frame or packet is loaded into the trace buffer.

DLCI The Data Link Connection ID. Identifies a particular logical link in the Frame Relay network.

Management Protocol State The DLCI state.

Value	Description
Active	The Management Protocol State is active.
Inactive	The Management Protocol State is not active.

Detail Status Fields

Port number Number of the Eiconcard being monitored.

Port name The name of the Eiconcard port being monitored.

Tx buffer window size (K) The size of the Frame Relay window for each DLCI. This window is used for transmission buffer control.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For a more detailed description, see “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, only the first 32 bytes of each frame or packet is loaded into the trace buffer.

DLCI The Data Link Connection ID. Identifies a particular logical link in the Frame Relay network.

Management Protocol State The DLCI state.

Value	Description
Active	The Management Protocol State is active.
Inactive	The Management Protocol State is not active.

SNA over Frame Relay Statistics

Command `ECMODULE STATS SNAFR [/Port p | portname] [/Connection n]`

When you issue the command `ECMODULE STATS SNAFR` from the gateway PC with an active SNA over Frame Relay connection, global statistical information about the protocol is displayed.

The following command displays global statistics of the Frame Relay connections on the specified Eiconcard port.

```
ECMODULE STATS SNAFR /P 1

Frame Relay Loadable Module Statistics
Port number: 01                      Port name: FRELAY01

Link up.....: 1                      Link down.....: 0
Link errors.....: 0                    Expired T1 timer.....: 35
Parse error.....: 0
Status Enquiry Message
Full status sent.....: 6
Sequence # exchange only...: 29

Unexpected Status Enquiry Response Message
Full status received.....: 0
Sequence # exchange only...: 0

                               Sent      Received
Frames.....: 0                  2599
bytes.....: 0                   332672
Sequence #0.....: 1             0
```

You may also obtain detailed statistical information on a particular DLCI station by issuing the following command:

```
ECMODULE STATS SNAFR /P 1 /C16

Frame Relay Loadable Module Statistics
Port number: 01                      Port name: FRELAY01

Port number.....: 0
DLCI.....: 16
DLCI up.....: 1                      DLCI down.....: 0
Backward congestion.....: 0          Forward congestion.....: 0

                               Sent      Received
Frames.....: 0                  1300
bytes.....: 0                   166400
```

Global Statistics Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

Link up Number of times the link went up.

Link down Number of times the link went down.

Link errors Number of times the modem signal was lost on the link.

Expired T1 timer The interval of time at which the Eiconcard initiates a Status Enquiry message.

Parse error Number of communications errors that were received.

Full Status sent Number of times a Full Status Report was sent.

Sequence # exchange only Number of Status message exchanges sent.

Full status received Number of times a Full Status Report was received.

Sequence # exchange only Number of Status message exchanges received.

Frames Number of frames sent or received.

bytes Number of bytes sent or received.

Sequence #0 The Status Enquiry message received or sent with a Receive Sequence = 0.

Detail Statistics Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

DLCI The Data Link Connection ID.

DLCI up Number of times the DLCI goes from active to inactive.

DLCI down Number of times the DLCI goes from inactive to active.

Backward congestion Number of frames received with backward congestion.

Forward congestion Number of frames received with forward congestion.

Frames Number of frames sent or received on this port connection.

bytes Number of bytes sent or received on this port connection.

X.25 Status

Command ECMODULE STATUS X25 [/Port n | portname] [/Connection n]

When you issue the command ECMODULE STATUS X25 from the gateway PC and with an active X.25 connection, status information is displayed.

The following command examines a specific port from the gateway PC and with an active X.25 connection:

```
ECMODULE STATUS X25 /P 1

X.25 Loadable Module Status
Port number: 01                               Port name: P1
                                         Default Maximum
Window size..... 2                        7
Packet size (bytes)..... 256              256
Packet format..... Extended Maximum retry count N3..... 3
Restart timer T20 (sec)..... 60            Reset timer T22 (sec)..... 60
Call timer T21 (sec)..... 60               Clear timer T23 (sec)..... 60
Idle timer (sec)..... 0                   Acknowledgement timer (msec): 20
Two-way VCs configured..... 8             Permanent VCs configured..... 0
In-coming VCs configured..... 0           Out-going VCs configured..... 0
Trace..... Off                           Trace buffer size (bytes).... 0
Trace filter (hex)..... 00               Trace entry size (bytes).... 0
Link activated at..... @21:07:08 Jan 16
Last restart..... @21:07:08 Jan 16
VC Local Address Remote Address Type      Status
-----
8                5540034622    2Way      Circuit Ready   @05:11:41 Jan 17
Command completed successfully.
```

You may also obtain detailed connection status by issuing this command:

```
ECMODULE STATUS X25 /P 1 /C 8

X.25 Loadable Module Status
Port number: 01                               Port name: P1
                                         Transmit Receive
Window size..... 2                        2
Packet size (bytes)..... 256              256
X.25 Call user facilities: None
X.25 Call user data:
cb 01 00 00 f1 f0 f0 f0 | f4 f5 40 40 00 00 00 00 <.....@@.....>
Trace..... Off                           Trace buffer size (bytes).... 0
Trace filter (hex)..... 00               Trace entry size (bytes).... 0
VC Local Address Remote Address Type      Status
-----
8                5540034622    2Way      Circuit Ready   @05:11:41 Jan 17
Command completed successfully.
```

Global Status Fields

Port number Number of the Eiconcard Port being monitored.

Port name The name of the Eiconcard Port being monitored.

Window size Number of packets that can be sent before waiting for an acknowledgment. Both Receive and Transmit values are shown. They are usually the same (symmetrical) but could be different.

Packet size (bytes) The size of the X.25 packet in bytes. Both Receive and Transmit values are shown. They are usually the same (symmetrical) but could be different.

Packet format In 1984, the CCITT added an Extended Packet definition to the X.25 specification.

Value	Description
Standard	Allow only the standard packets supported on all networks.
Extended	Allow a larger window size and use of extended clearing, call user data, and other features supported only by certain networks.

Maximum retry count N3 When a particular packet meets with repeated negative acknowledgments from the remote device, there must be a limit as to the number of retries made.

Restart timer T20 (sec) The Packet Level Restart timer in seconds.

Reset timer T22 (sec) The Reset Supervision timer in seconds.

Call timer T21 (sec) The Call Supervision timer in seconds.

Clear timer T23 (sec) This Clear Supervision timer in seconds.

Idle timer (sec) The Idle Connection timer in seconds.

Acknowledgment timer (msec) This is the Acknowledgment timer in milliseconds. If the application sends no data for the duration of this timer, your Eicon Networks software sends a Window Update.

Two-way VCs configured The total number of Two-way Virtual Circuits (TVC) configured in the Eicon Configuration Program.

Permanent VCs configured The total number of Permanent Virtual Circuits (PVC) configured in the Eicon Configuration Program.

Incoming VCs configured The total number of Incoming Virtual Circuits (IVC) configured in the Eicon Configuration Program.

Out-going VCs configured The total number of Out-going Virtual Circuits (OVC) configured in the Eicon Configuration Program.

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For more information, see “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, only the first 32 bytes of each frame or packet is loaded into the trace buffer.

Link activated at The time and date when the X.25 port was activated.

Last restart The time and date when the X.25 port was last reset.

VC The Virtual Circuit number of the Virtual Circuit being monitored.

Local Address The X.25 DTE Address for the circuit on the PC running your Eicon Networks software.

Remote Address The X.25 DTE Address of the remote computer for the virtual circuit.

Type Type of Virtual Circuit in use.

Value	Description
Permanent	Permanent, leased circuit.
Incoming only	Circuit for receiving calls only.
Outgoing only	Circuit for originating calls only.
Two-way	Circuit for receiving and originating calls.

Status The current status of the specified X25 port.

Value	Description
Pkt CLS	Closed
DTE Restart	The PC running your Eicon Networks software has sent a Restart Request packet.
DCE Restart	Restart indication packet was received.
Packet Ready	Virtual circuit is disconnected.
DTE Call	Outgoing Call Request was sent.
DCE Call	A Call Indication packet was received.
Call Collision	X.25 call collision.
Circuit Ready	X.25 virtual circuit is established.
DTE Clear	A Clear Request packet was sent.
DCE Clear	A Clear Indication packet was received. Remote requested termination of virtual circuit.
DTE Reset	The virtual circuit is locally reset.
DCE Reset	Remote reset the virtual circuit.

Detail Status Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

Window size Number of packets that can be sent before waiting for an acknowledgment. Both Receive and Transmit values are shown. They are usually the same (symmetrical) but could be different.

Packet size (bytes) The size of the transmit and receive X.25 data packets, in bytes. They are usually the same (symmetrical) but could be different.

X.25 Call user facilities Call user facilities are optional network services that provide features such as reverse charging, access to a Closed User Group, or specification of a Network User Identification. The call user facility field can contain up to 63 bytes.

X.25 Call user data Call user data can be used to request services specific to the host you are calling, such as a password, or to indicate your Protocol ID code. The call user data field can contain up to 10 bytes. The display shows both a “dump” format (see left-hand column) and the ASCII equivalent (see right-hand column).

Trace Indicates whether this protocol is currently being traced using ECMODULE TRACE.

Trace buffer size (bytes) The size of the trace buffer.

Trace filter (hex) The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The trace filter is specified as a two-digit hexadecimal number. For more information, see “Trace Filter” on page 172.

Trace entry size (bytes) This configures Trace to examine only the first *n* bytes of each frame or packet traced. If you have a Trace Entry Size of 32 bytes, only the first 32 bytes of each frame or packet is loaded into the trace buffer.

VC The Virtual Circuit number of the Virtual Circuit being monitored.

Local Address The X.25 DTE Address for the virtual circuit on the PC running your Eicon Networks software.

Remote Address The X.25 DTE Address of the remote computer for the virtual circuit.

Type Type of Virtual Circuit in use.

Value	Description
Permanent	Permanent, leased circuit.
Incoming only	Circuit for receiving calls only.
Outgoing only	Circuit for originating calls only.
Two-way	Circuit for receiving and originating calls.

Status The current status of the specified X25 port.

Value	Description
Pkt CLS	Closed
DTE Restart	The PC running your Eicon Networks software has sent a Restart Request packet.
DCE Restart	Restart indication packet was received.
Packet Ready	Virtual circuit is disconnected.
DTE Call	Outgoing Call Request was sent.
DCE Call	A Call Indication packet was received.
Call Collision	X.25 call collision.
Circuit Ready	X.25 virtual circuit is established.
DTE Clear	A Clear Request packet was sent.
DCE Clear	A Clear Indication packet was received. Remote requested termination of virtual circuit.
DTE Reset	The virtual circuit is locally reset.
DCE Reset	Remote reset the virtual circuit.

X.25 Statistics

Command	ECMODULE STATS X25 [/Port <i>n</i> <i>portname</i>] [/Connection <i>n</i>]
----------------	--

When you issue the command `ECMODULE STATS X25` from the gateway PC and with an active X.25 connection, statistical information is displayed.

The following command examines specific port statistics for a gateway PC and having an active X.25 module:

ECMODULE STATS X25 /P 1

X.25 Loadable Module Statistics

Port number: 01		Port name: P1	
	Sent	Received	
Call	request... 1	0	Data packets..... 275
	Confirm... 0	1	Data segments..... 275
Restart	request... 1	1	Characters..... 6616
	Confirm... 0	0	Receiver Ready.... 18
Register	request... 0	0	Receiver Not Ready: 0
	Confirm... 0	0	Diagnostic packets: 0
Clear	request... 0	0	Unknown packets... 0
	Confirm... 0	0	Rejects..... 0
Reset	request... 0	0	
	Confirm... 0	0	
Interrupt	request... 0	0	
	Confirm... 0	0	
Command Completed Successfully.			

You may also obtain detailed statistical information by issuing this command:

ECMODULE STATS X25 /P 1 /C 8

X.25 Loadable Module Statistics

Port number: 01		Port name: P1	
Virtual Circuit..... 8			
	Sent	Received	
Call	request... 1	0	Data packets..... 275
	Confirm... 0	1	Data segments..... 275
Restart	request... 0	0	Characters..... 6616
	Confirm... 0	0	Receiver Ready... 18
Register	request... 0	0	Receiver Not Ready: 0
	Confirm... 0	0	Diagnostic packets: 0
Clear	request... 0	0	Unknown packets... 0
	Confirm... 0	0	Rejects..... 0
Reset	request... 0	0	
	Confirm... 0	0	
Interrupt	request... 0	0	
	Confirm... 0	0	
Command Completed Successfully.			

Global and Detail Statistics Fields

Port number Number of the Eiconcard port being monitored.

Port name The name of the Eiconcard port being monitored.

Call Request Number of requests to establish a connection.

Call Confirm Number of acknowledged requests for a connection.

Virtual Circuit The X.25 VC connection number.

Data Packets Number of data packets transmitted and received.

Data Segments Number of 64 bytes data blocks sent and received.

Restart Request Number of requests to restart the packet level connection sent and received.

Restart Confirm Number of acknowledged requests for a packet level connection.

Characters Number of characters transmitted and received.

Receiver ready Number of RR flow control packets sent and received.

Register Request Number of register packets sent or received. Register packets are used to exchange registration information.

Register Confirm Number of acknowledged register packets sent or received.

Receiver not ready Number of times the receiver has not been ready for the incoming packet.

Diagnostic packets Number of error information packets sent and received.

Clear Request Number of requests to terminate a Virtual Circuit sent and received.

Clear Confirm Number of acknowledged requests for a Virtual Circuit termination.

Unknown packets Number of packets that could not be recognized as following the X.25 structure sent and received.

Rejects Number of times a packet has been rejected.

Reset Request Number of reset packets sent or received.

Reset Confirm Number of acknowledged requests for reset packets sent or received.

Interrupt Request Number of Interrupt packets, which are packets that go ahead of other normal packets sent and received.

Interrupt Confirm Number of acknowledged requests for Interrupt packets sent or received.

Analyzing Data: ECMODULE TRACE

Command ECMODULE TRACE *option* [/Filter *f*] [/REset] [/Block *b*] [/Size *n*] [/Truncate *n*] [/EBcdic] [/Outfile *f*] [/?]

The ECMODULE TRACE function can be an essential tool for the data communications expert. In most cases, you will use ECMODULE TRACE under the guidance of an Eicon Networks representative.

The following command shows trace data on an X.25 connection:

```
ECMODULE TRACE X25 /T 256
```

```
X.25 Loadable Module Trace
Port number: 01                      Port name: P1
X.25 Trace
Size = 2048 Length = 256 Block = 18 Mask = FF
BLK      -HH:MM:SS:MSEC
1        -00:14:27.000 TX CALL REQ      <10 04 0B> Data = 19
          0A 55 40 03 46 22 00 CB 01 00 00 F0 F1 F3 F1 F9 3.U@.F"..... 3
          F5 40 40 3.@@ 3
2        -00:14:27.000 RX CLEAR IND      <10 04 13> Data = 2
          00 C5 3.. 3
3        -00:14:27.000 TX CLEAR CNF      <10 04 17> Data = 0
4        -00:14:27.020 TX CALL REQ      <10 04 0B> Data = 19
          0A 55 40 03 46 22 00 CB 01 00 00 F0 F1 F3 F1 F9 3.U@.F"..... 3
          F5 40 40 3.@@ 3
5        -00:14:27.020 RX CLEAR IND      <10 04 13> Data = 2
          00 C5 3.. 3
6        -00:14:27.020 TX CLEAR CNF      <10 04 17> Data = 0
7        -00:14:27.040 TX CALL REQ      <10 04 0B> Data = 19
          0A 55 40 03 46 22 00 CB 01 00 00 F0 F1 F3 F1 F9 3.U@.F"..... 3
          F5 40 40 3.@@ 3
8        -00:14:27.040 RX CLEAR IND      <10 04 13> Data = 2
          00 C5 3.. 3
9        -00:14:27.040 TX CLEAR CNF      <10 04 17> Data = 0
10       -00:14:27.055 TX CALL REQ      <10 04 0B> Data = 19
          0A 55 40 03 46 22 00 CB 01 00 00 F0 F1 F3 F1 F9 3.U@.F"..... 3
          F5 40 40 3.@@ 3
11       -00:14:27.055 RX CLEAR IND      <10 04 13> Data = 2
          00 C5 3.. 3
12       -00:14:27.055 TX CLEAR CNF      <10 04 17> Data = 0
13       -00:14:28.000 TX CALL REQ      <10 04 0B> Data = 19
          0A 55 40 03 46 22 00 CB 01 00 00 F0 F1 F3 F1 F9 3.U@.F"..... 3
          F5 40 40 3.@@ 3
14       -00:14:28.001 RX CLEAR IND      <10 04 13> Data = 2
          00 C5 3.. 3
15       -00:14:28.001 TX CLEAR CNF      <10 04 17> Data = 0
16       -00:14:28.015 TX CALL REQ      <10 04 0B> Data = 19
          0A 55 40 03 46 22 00 CB 01 00 00 F0 F1 F3 F1 F9 3.U@.F"..... 3
          F5 40 40 3.@@ 3
17       -00:14:28.015 RX CLEAR IND      <10 04 13> Data = 2
          00 C5 3.. 3
18       -00:14:28.016 TX CLEAR CNF      <10 04 17> Data = 0
Command Completed Successfully.
```

Trace Buffer

Multiple trace buffers may be active at the same time for different port or connection numbers. The amount of available memory on your Eiconcard limits the number of traces you can have active. Each time you start a trace, ECMODULE TRACE sets aside a new trace buffer (default size 2048 bytes) on the Eiconcard.

Blocks and Protocol Elements

Information in the trace buffer is stored in blocks, with each block being based on a protocol element. ECMODULE TRACE creates a block by extracting the first n bytes, as indicated by the /Truncate parameter, from each protocol element in the data stream.

Protocol	Protocol Element
Frame Relay (FRELAY)	Frame
HDLC	Frame
LAPD	Frame
Q931	Message
SDLC	Frame
X.25	Packet
SNA	Frame
SNAFR	Frame
IDLC	Frame

Changing the Trace Buffer Size

To change the buffer size, use ECMODULE TRACE /SIZE n , where n is the buffer size. You must stop the trace first. A size of 0 stops the trace.

Trace Filter

The trace filter lets you tailor the trace to examine certain groups of elements within the data stream. The trace filter is one byte long, with each bit filtering a specific type of protocol element. *When you filter an element, you hide everything but that element.* The filter is a two-digit hexadecimal number.

Protocol	Filter	Description
Frame Relay (FRELAY)	01h	Data frames
	02h	LMI frames
HDLC Frame	01h	I-frames
	02h	RR frames
	04h	RNR, REJ frames
	08h	FRMR, SABM, DISC, UA frames
	10h	All other frames
SDLC	01h	I Frames
	02h	RR Frames
	04h	RNR and REJ Frames
	08h	FRMR, SABM, DISC, UA, and DM Frames
	10h	XID and all other Frames
X.25 Packet	01h	Data packets
	02h	RR, RNR packets
	04h	RESET, INTERRUPT packets
	08h	CALL, CLEAR packets
	10h	All other packets
SNA Frames	01h	LU-LU FMD
	02h	LU-LU DFC
	04h	LU-LU SC
	08h	SSCP-LU FMD
	10h	SSCP-LU SC
	20h	SSCP-Node Type FMD
	40h	SSCP-Node Type SC
IDLC Frames	01h	Supervisory format Frames
	02h	Unnumbered format Frames
	04h	Information transfer format Frames

Note *There are no Trace Filters available for the LAPD and Q931 protocols.*

Easy Mask Change

To change the trace mask, you should clear the mask before you set a new mask. Use the following command to do this:

```
ECMODULE TRACE /F FFnn
```

Replace *nn* with the value of the new mask(s). For example:

```
ECMODULE TRACE /F FF03
```

To trace all elements use the following command:

```
ECMODULE TRACE /F FFFF
```

To trace more than one type of protocol element, you can create a composite filter by adding together the filter value for each individual element. For example, with the X.25 protocol, to trace both RR/RNR and CALL/CLEAR packets, add their individual hexadecimal filters together. $02h + 08h = 0A$:

```
ECMODULE TRACE X25 /F FFOA
```

Sample ECMODULE TRACE Commands

Here are some examples of ECMODULE TRACE with different command line parameters:

```
ECMODULE TRACE X25 /P 2
```

Displays trace information on the X.25 protocol on port #2.

```
ECMODULE TRACE HDLC /P 4 /S 4096
```

Traces the HDLC protocol, on port #4, with a trace buffer size of 4096 bytes.

```
ECMODULE TRACE X25 /P 2 /F FF01
```

Displays only the data packets from an X.25 trace on port #2.

```
ECMODULE TRACE HDLC /P 2 /F FF03
```

Displays only the I and RR frames from the trace of the HDLC protocol on port #2. In this command the filter is set to hexadecimal 03 to display only the I and RR frames. The trace filter mask for I is hexadecimal 01, and for RR is hexadecimal 02, so to display both you add the masks together to get hexadecimal 03.

```
ECMODULE TRACE /R
```

Clears and resets the trace buffer.

```
ECMODULE TRACE X25 /P 3 /S 0
```

Ends the trace of the X.25 protocol on port #3.

```
ECMODULE TRACE FRELAY /P 2
```

Traces the communications data streaming through a Frame Relay connection on port #2.

```
ECMODULE TRACE FRELAY /C 3 /P 4
```

Traces the Frame Relay connection #3, on port #4, of the server.

Appendix A

Configuration Checklists

THIS APPENDIX PROVIDES ADDITIONAL INFORMATION ON HOW TO configure Eicon SNA Gateway, and provides checklists for sample configurations.

X.25 Connections

Eicon SNA Gateway supports connections across X.25 and X.25 over ISDN.

Configuration Checklist

The following checklist summarizes the information you need to configure Eicon SNA Gateway for X.25. Use the “F1” context sensitive online help in the Eicon Configuration Program for complete descriptions of these parameters.

We suggest that you make photocopies of the following configuration checklist, and complete one checklist for each X.25 connection you need to configure.

Description	Default	Value
X.25 address (Local DTE address)	none	_____
Does your X.25 network support basic or extended packets?		
In 1984, the ITU (formerly CCITT) added an Extended Packet definition to the X.25 specification. Consult your network subscription to see if you can make use of Extended Packet features. This parameter affects Window size and Packet size.	extended	_____
Does your X.25 network support CCITT 1984 X.25 Recommendation and TOA/NPI addressing?	1984 only	_____
What is the maximum window size?	7	_____
Default window size	2	_____
What is the maximum packet size?	128	_____
Default packet size	128	_____
Number of virtual circuits	4	_____
If your network uses non-sequential assignment of virtual circuits then determine the starting number for each one	1	_____
Determine the facilities you require. For more information, see Appendix C, “User Facilities and DTE Address Structure.”	none	_____
Determine the call user data you require	none	_____

HDLC Parameters

Any connection using the X.25 protocol also uses HDLC at a lower level. Collect the following HDLC-related information for each X.25 connection you will make:

Description	Default	Value
Determine if the Eiconcard port for this connection is DCE or DTE. For null-modem or back-to-back connections, one Eiconcard Connections for Windows 2000 PC must be DTE and the other DCE.	DTE	_____
Determine if your network uses the Poll bit in a non-standard manner. (FRMR to RR/RNR/REJ)	Yes	_____
Determine if your network supports extended sequence features.	Active	_____

SNA Over Frame Relay Connections

Eicon SNA Gateway supports connections across Frame Relay.

Configuration Checklist

The following checklist summarizes the information you need to configure the Frame Relay protocol software for use with Eicon SNA Gateway. Use the “F1” context sensitive online help in the Eicon Configuration Program for complete descriptions of these parameters.

We suggest that you make photocopies of the following configuration checklist, and complete one checklist for each Frame Relay connection you need to configure.

Collect the following information for each Frame Relay connection you will make:

Description	Default	Value
Type of local management interface (LMI) protocol supported by your network. You can also set to Auto LMI for automatic detection.	Annex.D	_____
How many DLCIs are assigned to the Frame Relay line? You can also set to Dynamic DLCI, which eliminates the need for static configuration of new DLCIs.	1	_____
What is the starting number for your DLCI sequence?	16	_____
What is the Window Size for each DLCI? This number must match the window size of the destination node.	2	_____
What is the maximum number of bytes of user data that can be contained in a Frame Relay frame?	1514	_____
Committed Information Rate (CIR)	64000 bps	_____
What is the Source Service Acces Point?	none	_____
What is the Destination Service Access Point?	none	_____
What is the Frame Format for your connection (Boundary Network Node or Boundary Access Node)?	BNN	_____
What is the Destination MAC Address (BAN only)?	none	_____
What is the Source MAC Address (BAN only)?	none	_____

SNA Over Frame Relay Features

In addition to basic Frame Relay support, Eicon SNA Gateway provides the following features:

Frame Relay over ISDN

You can configure a Frame Relay over ISDN router connection if you are using an ISDN-capable Eiconcard such as Eiconcard C21, C91, S51 and S91.

This type of connection uses the Frame Relay/ISDN port to establish a dynamic connection to a remote router.

Auto LMI

Auto LMI eliminates the need for static configuration of the Local Management Interface. This feature allows the Frame Relay Bearer Service (FRBS) to determine what LMI protocol is remotely active. The protocol will first try to detect the use of the LMI protocol in the following order: Annex D, LMI, Annex A, None.

SDLC Connections

Eicon SNA Gateway supports SDLC connections.

Configuration Checklist

The following checklist summarizes the information you need to configure the SDLC protocol software for use with Eicon SNA Gateway. Use the “F1” context sensitive online help in the Eicon Configuration Program for complete descriptions of these parameters.

We suggest that you make photocopies of the following configuration checklist, and complete one checklist for each SDLC connection you need to configure.

Collect the following information for each SDLC connection you will make:

Description	Default	Value
What type of SDLC connection are you using (<i>Nodes - Link Method</i>)?	non-switched	_____
What is your Maximum Window size(kilobytes)?	7	_____
What is the Frame Size?	267	_____
What is the maximum number of Link Stations allowed?	9	_____

Eicon IDLC Connections

Eicon SNA Gateway supports connections using the Eicon IDLC protocol to allow connections to the Eicon Token-Ring Bridge over ISDN.

Configuration Checklist

The following checklist summarizes the information you need to configure the Eicon IDLC protocol software for use with Eicon SNA Gateway. Use the “F1” context sensitive online help in the Eicon Configuration Program for complete descriptions of these parameters.

We suggest that you make photocopies of the following configuration checklist, and complete one checklist for each Eicon IDLC connection you need to configure.

Collect the following information for each Eicon IDLC connection you will make:

Description	Default	Value
What is the ISDN Switch Type?	NI-1	_____
What is the Destination MAC Address?	none	_____
What is the Source MAC Address?	none	_____
What is the Source Service Acces Point?	none	_____
What is the Destination Service Access Point?	none	_____

802.2 LLC Connections

802.2 LLC Connections are supported by SNA LAN Gateway only.

Configuration Checklist

The following checklist summarizes the information you need to configure 802.2 LLC nodes. Use the “F1” context sensitive online help in the Eicon Configuration Program for complete descriptions of these parameters.

We suggest that you make photocopies of the following configuration checklist, and complete one checklist for each 802.2 LLC node you need to configure.

Collect the following information for each 802.2 LLC node you will configure:

Description	Default	Value
What is the Node address of the remote system?	None	_____
What is the maximum Information Frame Size used by the Node(Maxdata)?	265	_____
What are the first 3 hexadecimal digits of the Host Exchange ID (Block Identifier)?	000 (for PU2.1) 017 (for PU2.0)	_____
What are the last 5 hexadecimal digits of the Host Exchange ID (Node Identifier)?	00000	_____
What is your establishment type?	Outgoing only	_____
What is the number of the adapter you will use for your 802.2 LLC connection?	0	_____
What is your local SAP address?	04	_____
What is your remote SAP address?	04	_____

SNA Node Parameters

The following checklist summarizes the information you will need for Node configuration, regardless of the connection type you select. Use the “F1” context sensitive online help in the Eicon Configuration Program for complete descriptions of these parameters.

We suggest that you make photocopies of the following configuration checklist, and complete one checklist for each Node you need to configure.

Description	Default	Value
What is the maximum Information Frame Size on the host system (MAXDATA)?	256	_____
What is the Control Unit Address of the host system?	C1	_____
What is the host Block Identifier (PU 2.0 and 2.1 only)?	none	_____
What is the host Node Identifier?	none	_____
What is the SNA Network Name — also called the Net ID (PU 2.1 only)?	none	_____
What is the DLCI Channel (SNA over Frame Relay only)?	varies	_____

Performance Optimization

THIS APPENDIX PRESENTS PERFORMANCE STATISTICS FOR ALL Eiconcards, and offers guidelines for optimizing performance. Use this information to choose the Eiconcard that takes fullest advantage of the bandwidth of your line, and maximizes packet switching capability, given practical LAN and X.25 line constraints.

Use the Eicon Configuration Program to modify the X.25 and HDLC parameters.

Line Speeds and Performance

Although the Eicon SNA Gateway software lets you adjust network parameters for the best performance, certain restrictions inherent to the network itself can limit throughput. Line speeds in excess of 128 kbps are possible on dedicated lines, but public X.25 data networks may be as slow as 2400 bps. A slow line will be filled before the Eiconcard reaches its transmission capacity.

Note *To modify the parameters discussed in this section, run the Eicon Configuration Program. If you are unfamiliar with communications protocols, you should not experiment with parameter settings.*

Propagation Delay

Propagation delay is a pitfall of public networks. Propagation delay is the time taken for signal transmission, error checking, and queuing between all the nodes in the transmission path. On some links, such as the ones serviced by satellites, round trip transmission time can approach a full second. Large propagation delays are often observed during heavy traffic periods.

Two features of the X.25 protocol work to minimize the impact of propagation delay.

- X.25 does error checking between intermediary nodes. This allows packets to be transmitted without waiting for end-to-end acknowledgment.
- X.25's windowing capability increases the number of packets that can be sent before receiving confirmation from the next node in the transmission path.

Novell NetWare Networks

Different versions of Novell NetWare IPX on the gateway and the workstation(s) can reduce performance or cause problems. Make sure you use the latest version of IPX on the gateway and workstations(s).

X.25 Window Size

Window Size specifies the packet interval at which information transfer stops while the sending node awaits acknowledgment from the receiver. Windowing allows more than one packet to be transmitted before an acknowledgment is received from the nearest node. X.25 windowing is designed to reduce waiting time for acknowledgments between nodes, as well as end-to-end.

If the Window Size is 10, an application can send ten packets before it must wait for an acknowledgment of receipt from the remote computer. Transmission of packets stops only when the maximum number of packets allowed by the transmit window has been sent and no acknowledgment has yet been received from the remote computer. When the remote computer acknowledges packets quickly, the transmission of packets flows continuously. One acknowledgment may confirm the receipt of several packets.

The Eiconcard allows window sizes ranging from 1 to 127 packets depending on the Eiconcard type and memory capacity. Increase Window Size for networks with larger delays.

Note *Few public X.25 networks offer windowing of more than 2 packets.*

When packet sizes are small, increasing the size of X.25 windows can increase effective throughput by as much as 20 percent. The ideal Window Size is one that allows continuous data flow without ever having the window closed waiting for an acknowledgment.

Note *X.25 allows negotiation of Window Size on a connection basis, depending on your subscription to the X.25 network.*

Satellite X.25 Networks

If you are transmitting data on an X.25 network that uses satellites, you may need a larger X.25 window. Satellite networks experience greater delays as the signals are relayed into orbit and back to earth.

HDLC Window Size

When modifying X.25 Window Size, you must also consider HDLC Window Size. X.25 packets are contained within HDLC Frames, and you can modify the HDLC Window Size to optimize transmission. Yet as the Window Size increases, so does the amount of data which must be re-transmitted in case of data error. The increased traffic from error recovery with a very large window may outweigh the efficiency gained by reduction of the effect of propagation delay.

If you transmit HDLC frames intermittently, in bursts, or receive many RNRs (Receiver Not Ready signals), you may need to change the HDLC Window Size. Try increasing the HDLC Window Size first. If this is unsuccessful, try reducing the Window Size. Unfortunately, most X.25 networks do not allow much leeway in modifying Window Size.

Note *The DTE and the DCE must have the same Window Size when the host and the gateway are connected directly through a null-modem cable, when one end of the cable is DTE and the other end is DCE. If the connection is through an X.25 network, the HDLC window must match that of the network (DCE), not that of the remote host.*

Buffer and Packet Size

Packet switching time constitutes a large share of the total processing time on X.25 equipment. The switching time rises with the number of packets processed. Increasing packet size improves performance by reducing transmission overhead because fewer packets are required to transmit a given amount of data. Processing time at each node in the circuit is also reduced.

Note *If the line quality is poor, and a large packet is rejected, you may consider reducing the packet size. If a large packet is rejected, it means that there is more data to reassemble and re-transfer. A smaller packet would have less data to reassemble and re-transfer, and would transmit faster.*

For optimal performance of the Eiconcard, the size of the data buffer ideally should be a multiple of the X.25 packet size. If the buffer size is not a multiple of the X.25 packet size, some X.25 packets will not be filled to their capacity. The buffer is set by the application you are using, but most applications do not let you modify the data buffer size.

Eliminating Retransmission

The most frequent cause of performance degradation in X.25 communications is the retransmission of rejected frames. Retransmission can be avoided by inserting a gap of processing time between frames. The size of the gap, measured in milliseconds, depends on your line speed.

This gap between frames can be created by inserting flags. This is usually not possible unless you have your own X.25 switch and can configure this parameter. The idea is to insert enough flags to simulate the smallest frame possible. The Eiconcard, and other X.25 devices, will then have sufficient time to process the previous frame before the next one arrives. The smallest frames are 4 bytes long including the FCS (frame checking sequence), such as the supervisory frames RR, RNR and REJ.

Minimum Frame Size and Processing Time

RR-Frame

Smallest Frame Size

Address Field	Control Field	FCS	FCS
---------------	---------------	-----	-----

RR-Frame

Minimum Frame Processing Time

Address Field	Control Field	FCS	FCS
---------------	---------------	-----	-----

Note *This problem cannot be reproduced in a testing environment where two Eiconcards are linked by a null modem cable to simulate an X.25 network connection. In the testing environment, Eicon Networks software sends RRs in a piggyback fashion if the data to transmit is in I-Frames. Otherwise, explicit RRs are sent.*

Calculating the Number of Flags

Calculation of the number of flags to be inserted between frames is illustrated in the following example:

If we assume a line speed of 64 kbps, or 8000 bytes per second, transmission of 1 byte takes 125 microseconds. Thus the interval that must be filled is:

$$2.0 - 0.5 = 1.5$$

Milliseconds required between frames. This depends on the line speed. - Milliseconds taken by one supervisory frame = Milliseconds remaining

One flag is equal to 1 byte, or an interval of 125 microseconds (on a 64 kbps line). Therefore:

$$1.5 \div 0.125 = 12$$

Milliseconds remaining to be filled \div Milliseconds per flag = Number of flags required

Appendix C

User Facilities and DTE Address Structure

THIS APPENDIX DESCRIBES USER FACILITIES, AND THE DTE ADDRESS structure. User Facilities allow you to configure optional network services such as reverse charging, accessing a Closed User Group, and specifying a Network User Identification (NUI). Included in this appendix is an explanation of the structure of the called-DTE and calling-DTE fields.

The DTE address structure described here is based on CCITT Recommendation X.25 (1988). To find out if your network differs from these specifications or uses earlier versions of them, see your X.25 subscription or your network manager.

Also included in this chapter are X.25 and ISDN Cause and Diagnostic Codes.

User Facility Support

X.25 Facilities are encoded into the Facility field of the call request packet without any interpretation on the part of the program. This allows you to specify any optional User Facilities, except for the packet retransmission Facility and extended packet sequence numbering (modulo 128).

The Facility field contains both Facility codes and their associated parameters. The code format varies since some Facilities may have one, two, or more parameters. Enter the contents of the User Facilities field as hexadecimal numbers separated by commas, as ASCII characters within either single or double quotation marks, or as a combination of both.

Facility Types

Facilities fall into two groups: those specified at subscription time, and those specified on a per-call basis.

Subscription Facilities

The first group includes CCITT Facilities such as nonstandard default window and packet sizes, Closed User Group definitions, barring of incoming or outgoing calls, and Reverse Charging.

Per-Call Facilities

The second group of Facilities are agreed upon at the time of subscription but can be used on a per-call basis. These Facilities include: Reverse Charging, indexing of a Closed User Group (CUG), or specification of a Network User Identification (NUI).

Facility Syntax

Facility codes are entered as a string of numbers and/or ASCII characters. The first parameter of a Facility code indicates the Facility you want to use. The subsequent parameters supply information about that Facility.

A request for CCITT Facilities must always precede all requests for non-CCITT Facilities. The National Facility Marker (0,0) need only be included when at least one request for a non-CCITT facility is present.

The following sections explain the syntax for Network User Identification, and Flow Control Negotiation.

Network User Identification (NUI): C6, NUIlength,NUI

The first parameter after the Facility code specifies the length in bytes of the NUI. This is followed by the NUI itself in a format determined by the network administration. The following shows how to encode the seven-character NUI *pass.id*.

C6,07,"pass.id"

Flow Control Negotiation (packet size):42,insize,outsize

Insize and *outsize* specify, respectively, the maximum length of incoming and outgoing packets. They are coded as the logarithm base 2 of the packet size, and may be offered by networks in the range of 4 through 12. That is, packet sizes from 16 through 4096 bytes. All networks must offer packet size 7 (128 bytes).

User Facility Request Codes

Certain Facilities may be specified on the PAD *call request* (CALL) command line. These same Facility Codes may also appear as a part of PAD Service Signals such as CLEAR and LISTENING.

Code	Facility
C	Charging information
E <i>Address Extension String</i>	Called Address Extension
F	Fast select with no restriction on response
G <i>CUG string</i>	Closed User group
N <i>NUI string</i>	Network User Identification
O <i>CUG string</i>	Closed User Group with outgoing access
Q	Fast select with restriction on response
R	Reverse charging
T <i>RPO string</i>	RPO transit network selection
P	Puts a Datapac Priority Traffic Indicator at the beginning of the Facility field. This is not a standard CCITT facility.

Examples of User Facilities

The following are examples of User Facilities and their corresponding codes.

User Facility	Code
National Facility Marker	0,0
Reverse Charging	1,1
Throughput Class Negotiation	2, <i>table</i>
Closed User Group (CUG) Selection	3, <i>CUG index</i>
Flow Control Negotiation (packet size)	42, <i>insize, outsize</i>
Flow Control Negotiation (window size)	43, <i>insize, outsize</i>
Network User Identification (NUI)	C6, <i>NUllength, NUI</i>

An Example of a Non-CCITT Facility

The DATAPAC Traffic Class Facility is an example of a non-CCITT Facility. One of its significant aspects is that it is compulsory when making an international call. Its coding is 1,1 and it must be preceded by the National Facility Marker (0,0). For example:

Priority Traffic:	0,0,1,1
Reverse Charging and Priority Traffic:	1,1,0,0,1,1

Other networks also define their own Facilities. If you receive repeated “Invalid Facility Request” messages or if you want to find out more about the Facilities applicable to you, contact your network representative.

Further Information on User Facilities

The forgoing text is not intended as an exhaustive description of the User Facilities supported either by the CCITT, or by the network you may be attempting to use. For information on CCITT User Facilities, consult the CCITT Recommendation *International User Services and Facilities in Public Data Networks*, Vol. VIII, Fascicle VIII.2, Rec. X.2.

DTE Address Structure

This section describes the structure of the called-DTE and calling-DTE field.

The DTE address structure described here is based on CCITT Recommendation X.25 (1988). To find out if your network differs from these specifications, or uses earlier versions of them, refer to your network manager.

DNIC

CCITT Recommendation X.121 defines a general address format which may be 12, 13, or 14 digits long. The first four digits make up the Data Network Identification Code (DNIC). The first three digits of the DNIC generally identify the country—much like area codes—with the exception of large countries such as the United States. The fourth digit identifies a particular network within that country.

In Canada, for example, DNICs begin with the digits 302. DATAPAC's DNIC is 3020. The DNIC for Infoswitch is 3029.

There is a listing of major public data networks together with their DNICs later in this chapter.

National Number

Digits 5 through 12 of the DTE address are known as the National Number, which identifies the DTE within the network. This is an address assigned to a specific location at the time of subscription.

Some networks support optional sub-addressing for use by the DTE on a per-call basis. When a sub-address is used, it will pass transparently through the network and will not be verified by the network. This one- or two-digit number may be used to address a particular PC on a local area network or a specific application program within a PC.

Note *The DTE Address format may vary from one network to another. You should, therefore, verify with your administration to what degree it is compatible with CCITT recommendations. For example, some networks prefix an international address with an escape digit: Telecom Canada's DATAPAC uses prefix 1.*

Examples of DTE Addresses

The following are examples of the DTE Address structures.

Example: SprintNet (Formerly Telenet)

The SprintNet numbering plan is consistent with CCITT Recommendation X.121 and follows the address structure of a four-digit Data Network Identification Code (DNIC) followed by a Network Terminal Number (NTN).

A SprintNet network address, which can consist of up to 14 digits, is defined by the following fixed-length fields:

Data Network Identification Code (4 digits)

The first four digits are the Data Network Identification Code as described earlier in this appendix.

Area Code Field (3 digits)

This field defines the area code associated with the Called DTE Address, and functions like a telephone area code.

Server DTE Address Field (5 digits)

This is the address assigned to the particular DTE at subscription time.

Port Field (2 digits)

This is an optional field used by the DTE only and is not interpreted by the network. For example, it can be used to identify different PCs on a LAN, or a specific application program. The Port Field must be in the range of 0 through 90 otherwise the network will clear the call.

When making a call within the SprintNet network, the DNIC must be 3110 and the address length must be either 12 or 14 digits. For calls outside SprintNet, the DTE Address length must be 4 to 14 digits long including the DNIC.

Example: DATAPAC (Telecom Canada)

DATAPAC local network addresses consist of up to ten digits: an eight-digit local address plus an optional two-digit sub-address. International addresses are composed in the following form: 1 + DNIC + NA, where NA is the network address.

DATAPAC internal calls can use either the national address or the international address with the DATAPAC DNIC (3020). All international addresses, however, must be preceded by the digit 1 (this international prefix is a DATAPAC option and is not passed between networks).

Note *All international calls must select Priority Traffic Class. For more information, see “An Example of Non-CCITT Facilities” in this appendix.*

For more information contact your DATAPAC representative, or access the DATAPAC Information Service (its DTE Address is 3020 92100086).

Example: Packet SwitchStream (British Telecom)

When connected to Packet SwitchStream (PSS), the full X.121 address (DNIC+ National Address number) must be used for inland as well as international calls.

Note *Your PC operates as a PSS packet mode DTE. Therefore, do not prefix an international address with the escape digit 9.*

Networks and DNICs

The following table shows the DNICs of various public data networks around the world. This table also includes information/test numbers. You can call them for further information about a given network or to test the results of your X.3 PAD parameter settings.

The numbers in this table are in effect at the time this manual was printed.

Country	Network	DNIC	Test Number
Argentina	ARPAC	7220	
Austria	Radio Austria	2320	
Austria	RADAUS	2329	
Austria	Datex-P	2322	
Bahamas	Batelco	3640	
Barbados	IDAS	3420	
Belgium	DCS	2062	
Bermuda	IPSD	3500	
Brazil	Interdata	7240	

Country	Network	DNIC	Test Number
Canada (Telecom)	Datapac	3020	76000002 Include "ECHO" in Call User Data field of <i>call request</i> or CONNECT command.
Canada (CN/CP)	Infoswitch	3029	
Chile	ENTEL	7302	
Colombia	DAPAQ	3107	
Denmark	Datapak	2382	
Dominican Republic	UDTS	3700	
Egypt	Arento	6020	
Finland	Finnpak	2442	
France	Transpac	2080	0030100
France	NTI	2081	
Germany	Datex-P	2624	5690049002 Include "ECHO" in Call User Data field of <i>call request</i> or CONNECT command.
Greece	Helpak	2022	
Guatemala	Guatel	7040	
Hong Kong	IDAS	4542	
Iceland	Icepak	2740	
Indonesia	SKDP	5101	
Ireland	IPSS	2721	
Ireland	EIRPAC	2724	
Israel	Isranet	4251	
Italy	ITAPAC	2227	
Jamaica	Jamatel	3380	
Japan (NTT)	DDX-P	4401	
Japan (KDD)	Venus-P	4408	
Luxembourg	Luxpac	2704	
Malaysia	Maypac	5021	
Mexico	Telepac	3340	
Netherlands	Datanet 1	2044	
Norway	Datapak	2422	
Panama	Intelpaq	7141	

Country	Network	DNIC	Test Number
Portugal	SABD	2682	
Puerto Rico	UDTS-PDIA	3301	
Singapore	Telepac	5252	
South Korea	DNS	4501	
Spain	Iberpac	2145	
Sweden	Telepak	2402	
Switzerland	Telepac	2284	
Thailand	IDAR	5250	
United Kingdom	IPSS	2341	
United Kingdom	PSS	2342	1920100513
United States	Accunet	3134	
United States	Autonet	3126	
United States	ITT	3103	
United States	RCA	3113	
United States	SprintNet	3110	20200142 ID: PHONES, PW: PHONES
United States	Tymnet	3106	
United States	WUI	3104	
Virgin Islands	UDTS-PDIA	3300	

X.25 Cause and Diagnostic Codes

A list of X.25 diagnostic and cause codes is shown below. These codes can help you trace the source of problems encountered with an X.25 connection.

Diagnostic Codes

Description	Diagnostic	Hex Code
NO ADDITIONAL INFORMATION	EX25NOINFO	00h
Invalid P(S)	EX25INVPS	01h
Invalid P(R)	EX25INVPR	02h
PACKET TYPE INVALID	EX25PKTINV	10h
For state r1	EX25PKTIR1	11h
For state r2	EX25PKTIR2	12h
For state r3	EX25PKTIR3	13h
For state p1	EX25PKTIP1	14h
For state p2	EX25PKTIP2	15h
For state p3	EX25PKTIP3	16h
For state p4	EX25PKTIP4	17h
For state p5	EX25PKTIP5	18h
For state p6	EX25PKTIP6	19h
For state p7	EX25PKTIP7	1Ah
For state d1	EX25PKTID1	1Bh
For state d2	EX25PKTID2	1Ch
For state d3	EX25PKTID3	1Dh
PACKET NOT ALLOWED	EX25PKTNA	20h
Unidentifiable packet	EX25UPKT	21h
Call on one way logical channel	EX25COWLC	22h
Invalid packet type on a PVC	EX25IPKT	23h
Packet on unassigned LCN	EX25PKTULC	24h
Reject not subscribed to	EX25REJNST	25h
Packet too short	EX25PKT2S	26h
Packet too long	EX25PKT2L	27h
Invalid GFI (General Format Identifier)	EX25IGFI	28h
Restart with non-zero GFI	EX25RN0GFI	29h
Packet type not compatible with facility	EX25PKTNCF	2Ah

Description	Diagnostic	Hex Code
Unauthorized interrupt confirmation	EX25UINTRC	2Bh
Unauthorized interrupt	EX25UINTR	2Ch
Unauthorized reject	EX25UREJ	2Dh
TIMER EXPIRED	EX25TIMEXP	30h
For incoming call	EX25TEIC	31h
For clear indication	EX25TECI	32h
For reset indication	EX25TERI	33h
For restart indication	EX25TERAI	34h
CALL SET-UP, CALL CLEARING OR REGISTRATION PROBLEM	EX25CSUP	40h
Facility/registration code not allowed	EX25FCNA	41h
Facility parameter not allowed	EX25FPNA	42h
Invalid called address	EX25ICDA	43h
Invalid calling address	EX25ICGA	44h
Invalid facility/registration length	EX25IFRLEN	45h
Incoming call barred	EX25ICBARRED	46h
No logical channel available	EX25NLCAVAIL	47h
Call collision	EX25CALLCOLL	48h
Duplicate facility requested	EX25DUPFACREQ	49h
Non-zero address length	EX25N0ADDRLEN	4Ah
Non-zero facility length	EX25N0FACLEN	4Bh
Facility not provided when expected	EX25FNOTPROV	4Ch
Invalid CCITT-specified DTE facility	EX25ICCITTF	4Dh
MISCELLANEOUS		50h
Improper cause code from DTE	EX25IMPCODE	51h
Non-aligned byte (octet)	EX25NOTALIGN	52h
Inconsistent Q-bit setting	EX25IQBITSET	53h
INTERNATIONAL PROBLEM	EX25INTLPROB	70h
Remote network problem	EX25RNETPROB	71h
International protocol problem	EX25INTLPPROB	72h
International link out of order	EX25INTLLOOR	73h
International link busy	EX25INTLBUSY	74h
Transit network facility problem	EX25TNETFPROB	75h
Remote network facility problem	EX25RNETFPROB	76h

Description	Diagnostic	Hex Code
International routing problem	EX25INTLRPROB	77h
Temporary routing problem	EX25TEMPRPROB	78h
Unknown called DNIC	EX25UCDNIC	79h
Maintenance action	EX25MAINTACT	7Ah

Cause Codes

Description	Causes	Hex Code
CLEARING CAUSES		
DTE originated call	EX25DTEORG	00h
Number busy	EX25NUMBUSY	01h
Invalid facility request	EX25IFREQ	03h
Network congestion	EX25NETCONG	05h
Out-of-order	EX25OUTORDER	09h
Access barred	EX25ABARRED	0Bh
Not obtainable	EX25NOTOBT	0Dh
Remote procedure error	EX25REMPROC	11h
Local procedure error	EX25LOCPROC	13h
RPOA out of order	EX25RPOAOOR	15h
Reverse charging not subscribed to	EX25REVCHRGNS	19h
Incompatible destination	EX25INCDEST	21h
Fast Select acceptance not subscribed to	EX25FASTSELNS	29h
Ship absent (for mobile maritime service)	EX25SHIPABS	39h
RESETTING CAUSES		
DTE originated call	EX25RDTEORG	00h
Out of order (PVC only)	EX25ROUTORDER	01h
Remote procedure error	EX25RREMPROC	03h
Local procedure error	EX25RLOCPROC	05h
Network congestion	EX25RNETCONG	07h
Remote DTE operational (PVC only)	EX25RREMDTEOP	09h
Network operational (PVC only)	EX25RNETOP	0Fh
Incompatible destination	EX25RINCDEST	11h

ISDN Cause and Diagnostic Codes

This section lists all ISDN cause and diagnostic codes according to the ISDN switch type. These codes can be useful when tracing the source of problems with an ISDN connection. Note that some cause values may have further meanings in addition to the diagnostics given. Also, Diagnostic shown as “None” indicates that the diagnostic is not applicable, not documented, or unavailable.

Implementation	Country / Region	Page
NI-1	North America	202
TPH1962	Australia	205
Euro and INS-Net 64	Europe and Japan	206
AT&T 5ESS	North America	209

NI-1 (North America)

1. CCITT-standardized cause values:

Hex	Cause	Diagnostic
01	Unallocated (unassigned) number	None
02	No route to specified transit network	None
03	No route to destination	None
06	Channel unacceptable	None
07	Call awarded and being delivered in an established channel	None
10	Normal call clearing	None
11	User busy	None
12	No user responding	None
13	No answer from user (user alerted)	None
15	Call rejected	None
16	Number changed	None
1A	Non-selected user clearing	None
1B	Destination out of order	None
1C	Invalid number format (incomplete address)	None
1D	Facility rejected	None
1E	Response to status inquiry	None
1F	Normal, unspecified	None

Hex	Cause	Diagnostic
22	No circuit/channel available	None
26	Network out of order	None
29	Temporary failure	None
2A	Switching equipment congestion	None
2B	Access information discarded	Info element identifier
2C	Requested circuit/channel not available	None
2F	Resource unavailable, unspecified	None
32	Requested facility not subscribed	None
35	Outgoing calls barred within CUG	None
37	Incoming calls barred within CUG at destination	None
39	Bearer capability not authorized	None
3A	Bearer capability not presently available	None
3F	Service or option not available, unspecified	None
41	Bearer capability not implemented	None
45	Requested facility not implemented	None
46	Only restricted digital information bearer capability is available	
4F	Service or option not implemented, unspecified	None
51	Invalid call reference value	None
52	Identified channel does not exist	None
53	A suspended call exists, but this call identity does not	None
54	Call identity in use	None
55	No call suspended	None
56	Call having the requested call identity has been cleared	None
57	User not member of CUG	None
58	Incompatible destination	None
5A	Non-existent CUG	None
5B	Invalid transit network selection	None
5F	Invalid message, unspecified	None
60	Mandatory information element is missing	Info element ID
61	Message type non-existent or not implemented	Message type
62	Message not compatible with call state or message type non-existent or not implemented	Message type
63	Information element non-existent or not implemented	Info element ID

Hex	Cause	Diagnostic
64	Invalid information element contents	Info element ID
65	Message not compatible with call state	Message type
66	Recovery of timer expiry	None
6F	Protocol error, unspecified	None
7F	Interworking, unspecified	None

2. National-specific cause values:

Hex	Cause	Diagnostic
04	Vacant Code	None
08	Prefix 0 dialed in error	None
09	Prefix 1 dialed in error	None
0A	Prefix 1 not dialed	None
0B	Excessive digits received, call is proceeding	None

3. Network-specific cause values:

Hex	Cause	Diagnostic
08	Call is proceeding	None
0D	Service denied	None
1C	Special Intercept Announcement	None
1D	Special Intercept Announcement Undefined Code	None
1E	Special Intercept Announcement Number Unassigned	None
1F	Special Intercept Announcement Call Blocked Due To Group Restriction	None
33	Call Type incompatible with service request	None
35	Service operation violated	Long-term denial, short-term denial
65	Protocol error threshold exceeded	None

TPH1962 (Australia)**Hex Cause**

01	Unallocated (unassigned) number
06	Channel unacceptable
10	Normal clearing
11	User busy
12	No user responding
15	Call rejected
16	Number Changed
1A	Non-selected user clearing
1B	Destination out of order
1C	Invalid number format (incomplete address)
1D	Facility rejected
1E	Response to STATUS ENQUIRY
1F	Normal, unspecified
22	No circuit/channel available
26	Network out of order
29	Temporary failure
2A	Switching equipment congestion
2B	Access information discarded
2C	Requested circuit/channel not available
2F	Resource unavailable, unspecified
32	Requested facility not subscribed
35	Outgoing calls barred within CUG
37	Incoming calls barred within CUG at destination
39	Bearer capability not authorized
3A	Bearer capability not presently available
3F	Service or option not available, unspecified
41	Bearer capability not implemented
42	Channel type not implemented
46	Only restricted digital information bearer capability is available
4F	Service or option not implemented, unspecified
51	Invalid call reference value
52	Identified channel does not exist

Hex Cause

53	A suspended call exists, but this call identity does not
54	Call identity in use
55	No call suspended
57	Destination not member of CUG
58	Incompatible destination
5A	Non-existent CUG
5F	Invalid message, unspecified
60	Mandatory information element is missing
61	Message type non-existent or not implemented
62	Message not compatible with call state or message type non-existent or not implemented
63	Information element non-existent or not implemented
64	Invalid information element contents
65	Message not compatible with call state
66	Recovery on timer expiry
6F	Protocol error, unspecified
7F	Interworking, unspecified

EuroISDN (Europe) and INS-Net 64 (Japan)

Hex	Cause	Diagnostic
01	Unallocated (unassigned) number	None
02	No route to specified transit network	None
03	No route to destination	None
06	Channel unacceptable	None
07	Call awarded and being delivered in an established channel	None
10	Normal call clearing	None
11	User busy	None
12	No user responding	None
13	No answer from user (user alerted)	None
15	Call rejected	None
16	Number changed	None
1A	Non-selected user clearing	None
1B	Destination out of order	None

Hex	Cause	Diagnostic
1C	Invalid number format	None
1D	Facility rejected	None
1E	Response to STATUS ENQUIRY	None
1F	Normal, unspecified	None
22	No circuit/channel available	None
26	Network out of order	None
29	Temporary failure	None
2A	Switching equipment congestion	None
2B	Access information discarded	Discarded information element identifier(s)
2C	Requested circuit/channel not available	None
2F	Resources unavailable, unspecified	None
31	Quality of service unavailable	None
32	Requested facility not subscribed	None
35	Outgoing calls barred within CUG	None
37	Incoming calls barred with CUG at destination	None
39	Bearer capability not authorized	None
3A	Bearer capability not presently available	None
3F	Service or option not available, unspecified	None
41	Bearer capability not implemented	None
42	Channel type not implemented	None
45	Requested facility not implemented	None
46	Only restricted digital information bearer capability is available	None
4F	Service or option not implemented, unspecified	None
51	Invalid call reference value	None
52	Suspended call exists, but identified channel does not	None
53	A suspended call exists, but this call identity does not	None
54	Call identity in use	None
55	No call suspended	None
56	Call having the requested call identity has been cleared	None
58	Incompatible destination	None
5A	Non-existent CUG	None
5B	Invalid transit network selection	None

Hex	Cause	Diagnostic
5F	Invalid message, unspecified	None
60	Mandatory information element is missing	Information element identifier(s)
61	Message type non-existent or not implemented	Message type
62	Message not compatible with call state or message type non-existent or not implemented	Message type
63	Information element non-existent or not implemented	Information element identifier(s)
64	Invalid information element contents	Information element identifier(s)
65	Message not compatible with call state	Message type
66	Recovery on timer expiry	Timer number
6F	Protocol error, unspecified	None
7F	Interworking, unspecified	None

AT&T 5ESS (North America)

Hex Cause

01	Unallocated (unassigned) number
02	No route to specified network
03	No route to specified transit network
10	Normal clearing
11	User busy
12	No user responding
13	User alerting, no answer
15	Call rejected
16	Number Changed
1B	Destination out of order
1C	Invalid number format (incomplete number)
1D	Requested facility rejected
1E	Response to status enquiry
1F	Normal, unspecified
22	No channel available
23	Call queued
29	Temporary failure
2A	Network congestion
2B	Access information discarded
32	Requested facility not subscribed
34	Outgoing calls barred
36	Ingoing calls barred
3A	Bearer capability not presently available
3F	Service or option not available, unspecified
41	Bearer capability not implemented
42	Channel type not implemented
45	Requested facility not implemented
51	Invalid call reference value
52	Identified channel does not exist
58	Incompatible destination
5B	Transit network does not exist
60	Mandatory information element is missing

Hex Cause

61	Message type nonexistent or not implemented
62	Message not compatible with call state
64	Invalid information element contents
66	Recovery of timer expiry
6F	Protocol error, unspecified
7F	Interworking, unspecified

ASCII Control Codes

ASCII control characters (ASCII characters 0 through 31) are entered as key sequence. A table of ASCII control characters, their keyboard entry sequences, and their common mnemonic references appears below:

Decimal value	Mnemonic	Keyboard entry
0	NUL	CTRL-2
1	SOH	CTRL-A
2	STX	CTRL-B
3	ETX	CTRL-C (Also known as Break Signal by PAD)
4	EOT	CTRL-D
5	ENQ	CTRL-E
6	ACK	CTRL-F
7	BEL	CTRL-G
8	BS	CTRL-H-left arrow
9	HT	CTRL-I-tab
10	LF	CTRL-J
11	VT	CTRL-K
12	FF	CTRL-L
13	CR	CTRL-M or ENTER
14	SO	CTRL-N
15	SI	CTRL-O
16	DLE	CTRL-P
17	DC1	CTRL-Q
18	DC2	CTRL-R
19	DC3	CTRL-S
20	DC4	CTRL-T
21	NAK	CTRL-U
22	SYN	CTRL-V
23	ETB	CTRL-W
24	CAN	CTRL-X
25	EM	CTRL-Y
26	SUB	CTRL-Z
27	ESC	ESC or CTRL-[

Decimal value	Mnemonic	Keyboard entry
28	FS	CTRL-\
29	GS	CTRL-]
30	RS	CTRL-6
31	US	CTRL- -
127	DEL	DEL

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